



VS 150

VHS MOVIE

TECHNICAL DATA

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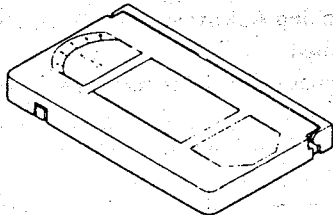
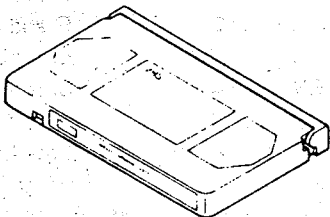
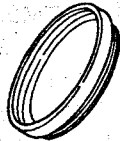
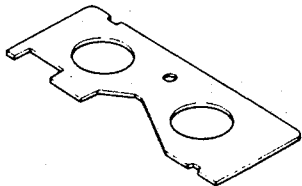
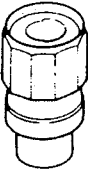
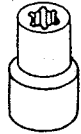
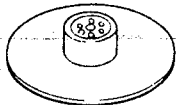
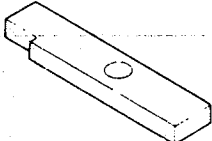
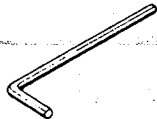
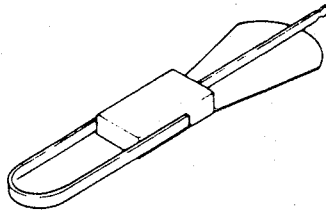
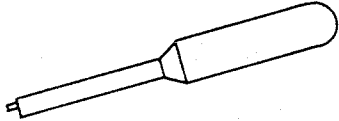
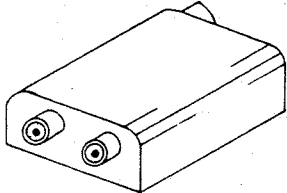
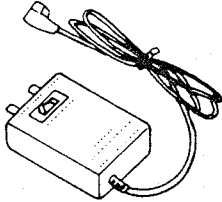
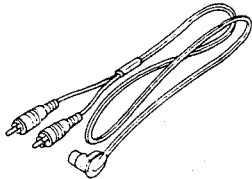
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ADJUSTMENT

SERVICING JIGS AND TOOLS

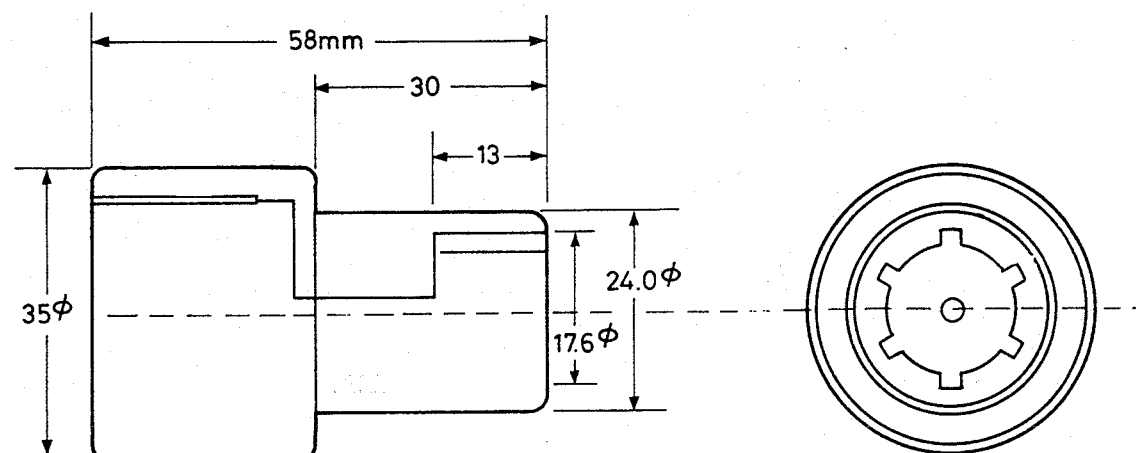
1. Back Tension Meter Parts No. 7099004 	2. Alignment Tape Parts No. 7099052 	3. Light Balancing Filter Parts No. 7099207 
4. Master Plane Parts No. 7099041 	5. Torque Gauge Parts No. 7099039 	6. Torque Gauge Adapter Parts No. 7099204 
7. Dummy Reel Parts No. 7099043 	8. Reel Disk Height Jig Parts No. 7099038 	9. 0.9 mm Hexagonal Wrench 
10. Fan Type Tension Gauge 	11. Back Focus Adjustment Driver Parts No. 7099205 	12. AV Input Adapter VM-CH20E 
13. RF Converter Unit VM-RF20E VM-RF20E(AU) 	14. AV Output Cable VM-CH25E 	

Service Parts

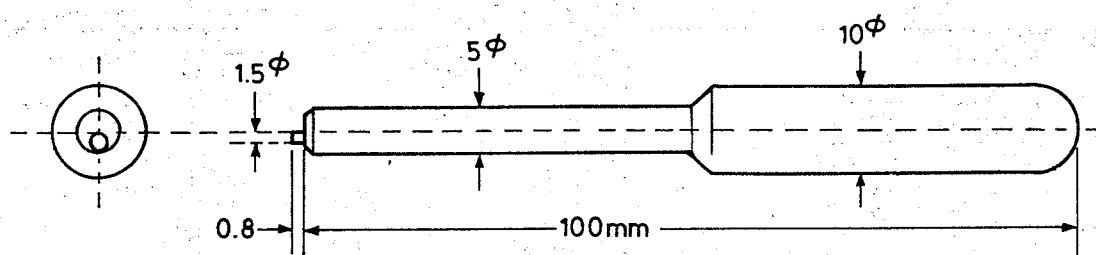
No.	MODEL	PARTS No.
12	VM-CH20E	5659991
	VM-RF20E	7095221
13	" (AU)	7095201
14	VM-CH25E	5855332

NEW SERVICE JIG AND TOOLS SPECIFICATIONS

PARTS NO.	DESCRIPTION	MODEL
7099204	TORQUE GAUGE ADAPTOR	VM-200E



PARTS NO.	DESCRIPTION	MODEL
7099205	BACKFOCUS ADJUSTMENT DRIVER	VM-200E



MECHANICAL ADJUSTMENT

1. MECHANISM STATE SWITCH ADJUSTMENT

Loading Cam Gear (Supply/Take-up) Adjustment (Fig. 3-1)

Be sure to perform this adjustment after replacing the Loading Cam Gear (Supply/Take-up), before adjusting the Mechanism State Switch.

1. Check that marking (1) on the supply loading cam gear and the marking on the take-up loading cam gear aligned. If they are not aligned, reassemble the loading cam gears.

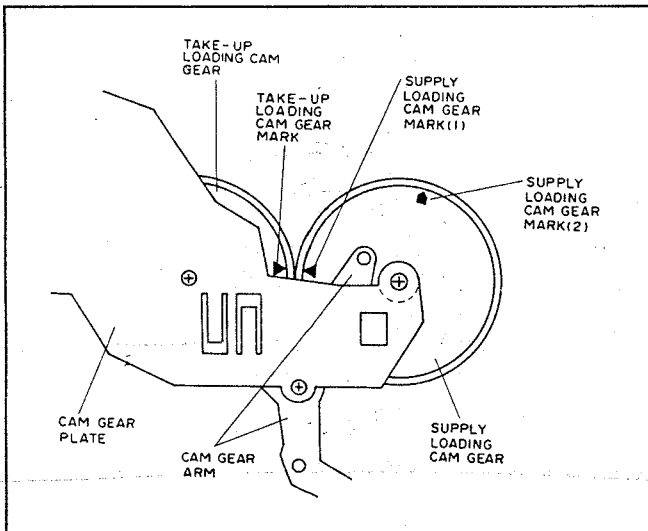


Fig. 3-1 Loading Cam Gear (Supply/Take-up) Adjustment

Mechanism State Switch Adjustment (Fig. 3-2)

Be sure to perform this adjustment after replacing the mechanism state switch and loading cam gears (supply/take-up).

1. Assemble the mechanism state switch and cam gear T so marking (1) on the mechanism state switch and marking (1) on cam gear T are aligned. (See Fig. 3-2(A))
2. Turn cam gear T in the direction of the arrow so that marking (1) on the mechanism state switch and marking (1) on the switch holder are aligned. (See Fig. 3-2 (B))
3. Check that the loading cam gear adjustment is performed correctly.
4. Assemble the mechanism state switch holder into the chassis so that marking (2) on cam gear T and marking (2) on the supply loading cam gear are aligned. Check that marking (2) on the mechanism state switch and marking (2) on the switch holder are aligned at this time. (See Fig. 3-2 (C)) If they are not aligned, readjust the mechanism state switch.

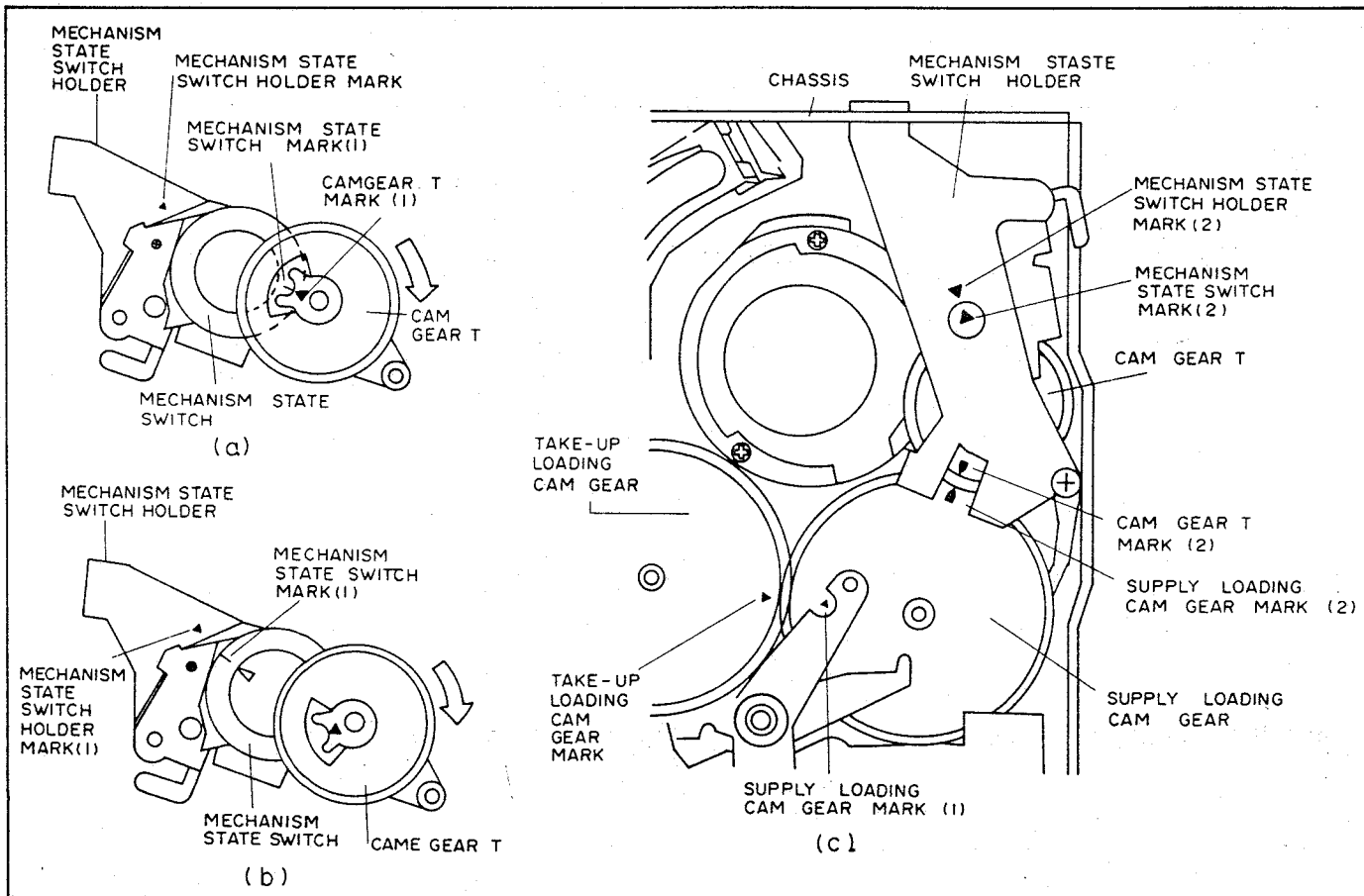


Fig. 3-2 Mechanism State Switch Adjustment

2. TAPE TRANSPORT SYSTEM COMPONENTS CHECK/ADJUSTMENT

The tape transport system is the part from the supply reel to the take-up reel via the video head.

The tape transport components, especially the components which came into direct contact with the tape should be kept clean without damage, dust and oil, etc. adhering to the contact surfaces. The tape transport system is adjusted before shipment from the factory, so when any transport components are replaced, the transport system is stabilized by correctly adjusting the new components.

Reel Disk Height Adjustment (Fig. 3-3)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the reel disk.
3. Check that the top of the reel disk is positioned between section A and B of the reel disk height jig.
4. When the top of the reel disk is positioned between section A and B, adjust the number of the spacers (3 types: 0.13 mm, 0.25 mm and 0.5 mm in thick) at the bottom of the reel disk.

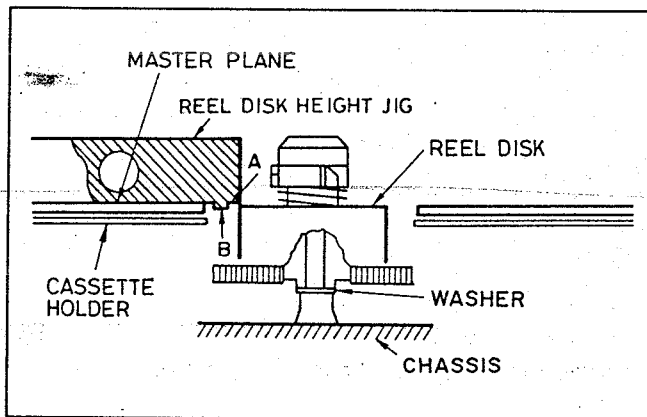


Fig. 3-3 Reel Disk Height Adjustment

Tension Pole Position/Tension Adjustment

Position Adjustment (Fig. 3-4)

1. Set the tension spring to position "B" on the spring holder.
2. Cover up the supply tape-sensor photocell located midway on the left side of the tape mechanism.
3. Place instrument in the "play" mode.
4. After loading is complete, loosen the screw holding the tension band holder. Then, slide the holder and adjust so that the clearance between section A of the supply end sensor holder and the tension arm is 1.4 to 2.0 mm.
5. Tighten screw to secure adjustment.

Tension Adjustment (Fig. 3-4)

1. Load the instrument with the back tension adjustment tape.
2. Place the instrument in the "play" mode.
3. Read the scale on the supply reel.
4. This reading should be between 27 and 38.
5. Move the tension arm spring to the position "A" on the spring holder when the tension adjustment tape reads 39 or higher, and to the position "C" on the spring holder when it is 26 or lower, and adjust the back tension for a nominal reading of 27-38 on the scale.
6. Recheck the tension arm position when the back tension is changed greatly (5 or more).

Note: The instrument must be in a horizontal position for this adjustment.

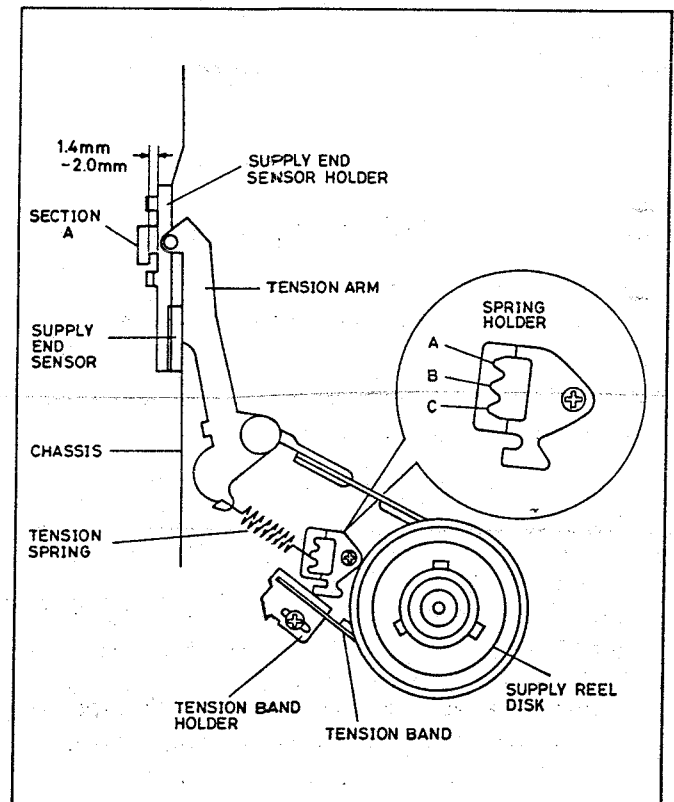


Fig. 3-4 Tension Pole Position/Tention Adjustment

Impedance Roller Height Adjustment (Fig. 3-5)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the impedance roller.
3. Turn the impedance roller height adjusting nut so that the gap between the top of the impedance roller and the top of the jig is 1.5mm to 2.5mm.
4. Load a blank tape, run it and check that the tape does not ride over the upper and lower edge of the roller.

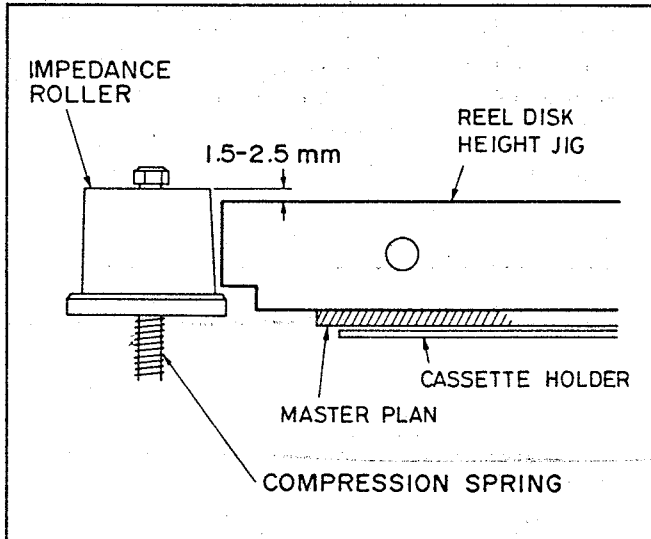


Fig. 3-5 Impedance Roller Height Adjustment

Guide Pole Height Adjustment (Fig. 3-6)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the guide pole.
3. Turn the guide pole height adjusting nut so that the gap between the upper flange of the guide pole and the top of the jig is $0.1\text{mm} \pm 0.1\text{mm}$.
4. Load a blank tape, run it and check that the tape does not ride over the upper and lower flanges of the pole.

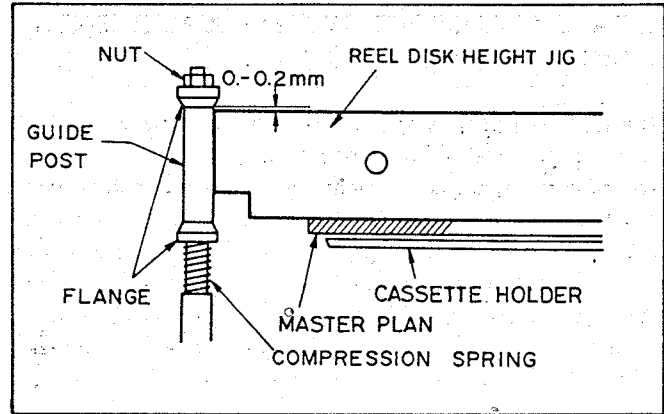


Fig. 3-6 Guide Pole Height Adjustment

Guide Roller Height Adjustment (Figs. 3-7, 3-8)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the guide roller.
3. Tighten the guide roller fixing screw at the position when the upper flange of the guide roller and the top of the jig match.
4. Run the tape and check that the tape does not curl and ride over, and then perform the electrical adjustment.
5. Connect the oscilloscope to TP204 on the main board.
6. Playback the colour bar test tape and set the tracking control to the click position.
7. Check that the FM waveform is flat.
8. Then check that the FM drops at the start and end of the envelope are equal when the tracking control is turned to the left and right.
9. When the FM drops at the start and end of the envelope are not equal, loosen the guide roller fixing screw, turn the guide roller a little to the left and right so that they are equal.
10. Tighten the fixing screw.

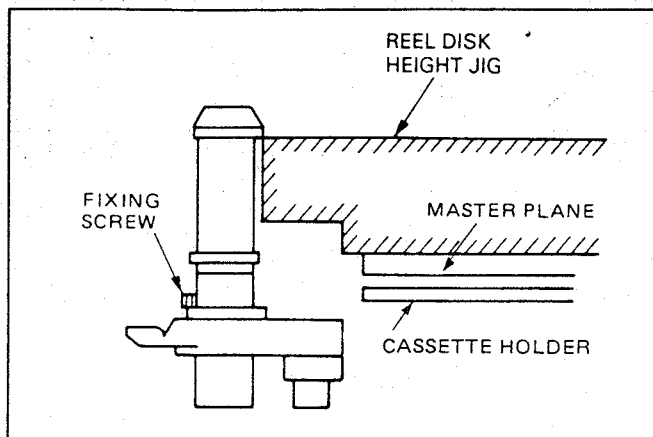


Fig. 3-7 Guide Roller Height Adjustment

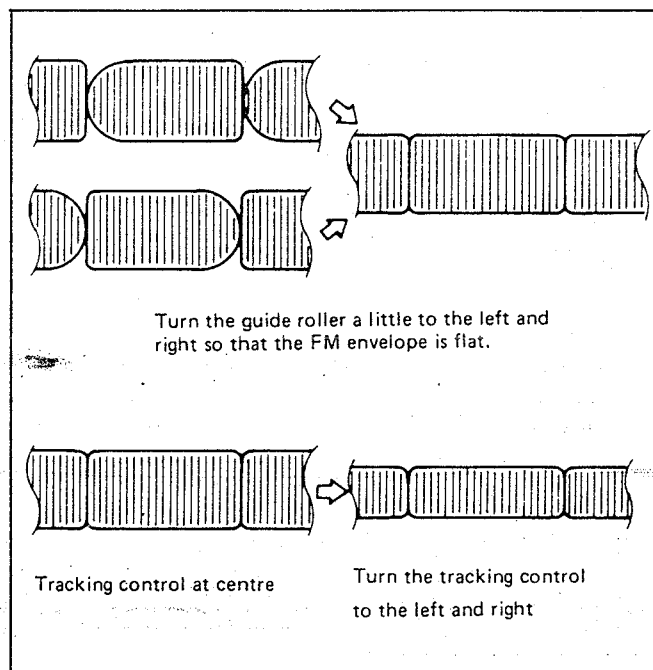


Fig. 3-8 Guide Roller Height Adjustment

A/C Head Adjustment (Figs. 3-9, 3-10, 3-11, 3-12)

Perform the height, tilt and azimuth adjustments repeatedly to determine the A/C head installation position, then adjust X value.

Detailed adjustment below is the procedure when the A/C head is replaced; be sure to do precise adjustment after rough adjustment.

Rough adjustment

1. Remove the cassette lid and left case before making adjustment.
2. Check that it is 2.5 – 3 mm between the top of Nut (A) and point of the shaft. If it is not, adjust Nut (A).
3. Install the height reference plate in its proper position.
4. Adjust azimuth Screw (B), Tilt Screw (C) and Screw (F) so the height difference between the height reference plate and A/C head base (1) is 1 – 2 mm and A/C head bases (1) and (2) are parallel.

Precise adjustment

5. Connect the oscilloscope to PG903-6 on the main board.
6. Playback a 6-kHz audio signal on alignment tape.
7. Adjust azimuth screw (B) and tilt screw (C) for maximum output.

X-value adjustment

8. Connect the oscilloscope to TP204 on the main board.
9. Trigger the oscilloscope at SW30Hz. (Use TP205 on the main board)
10. Set the Tracking control (RV101) to the detent (fixed) position.
11. Loosen two (2) screws (D and E).
12. Playback a alignment tape.
13. Carefully move the A/C head base plate in either direction for maximum head envelope output by adjusting the X-value adjust point.
14. Lock two (2) screws (D and E) with paint.

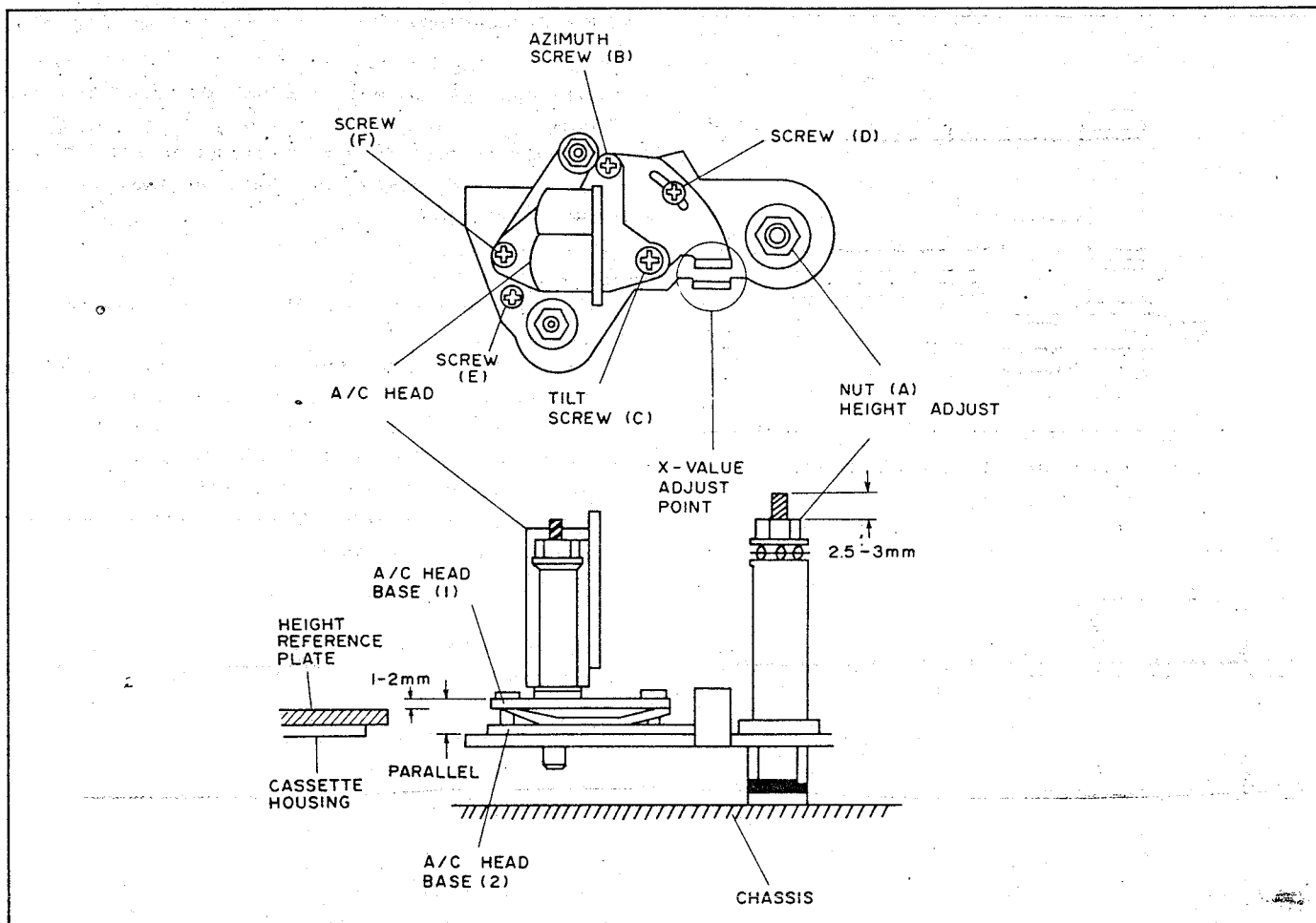


Fig. 3-9 A/C Head Adjustment

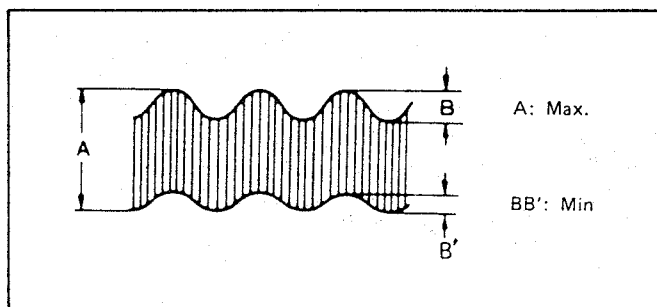


Fig. 3-10 A/C Head Adjustment

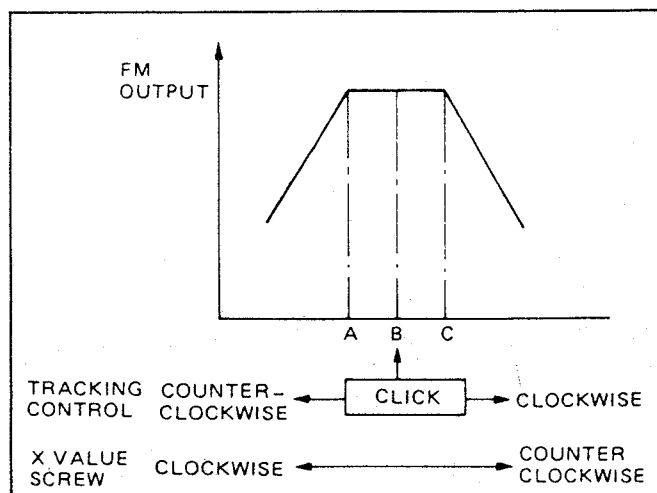


Fig. 3-11 A/C Head Adjustment

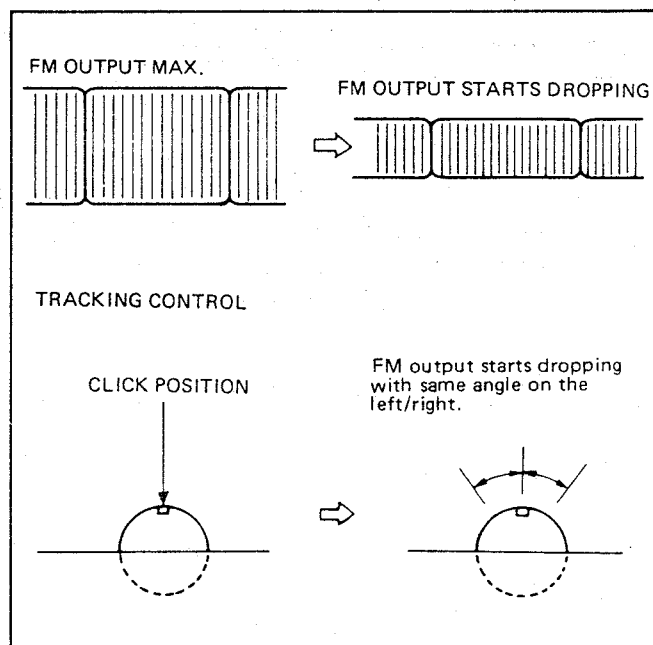


Fig. 3-12 A/C Head Adjustment

Adjustment After Replacing Cylinder (Video Head)

When the cylinder is replaced, the relative height between the cylinder and guide roller and the X value, etc. drift, so adjustments of the tape transport system and servo system are required.

However, the drifts in the relative height and X value are very little when the cylinder is replaced normally, so that can be corrected by electrical adjustments.

1. Check the no curl crease occurs around the guide roller.
Adjust the guide roller height when they occur.
2. Perform tracking preset adjustments (Servo section).
3. Adjust the X value (described in "A/C Head Adjustment").
4. Check the flatness and level fluctuations of the FM output. The checking method is described later.
5. Adjust the servo section and Y/Chroma section.
 - Head Switching Point Adjustment
 - Tracking Preset Adjustment
 - Record Luminance Level Adjustment
 - Record Chroma Level Adjustment

Check Flatness and Level Fluctuations of the FM Output

1. Set the tracking control to the click position.
2. Fine adjust the voltage level range of the oscilloscope and set the FM output to 4 graduations.
3. Turn the tracking control to set the maximum amplitude of the FM output to 3 graduations.
4. Check that the minimum amplitude is more than 2 graduations.
5. Check that the level difference between the maximum and minimum amplitudes is less than 13%.

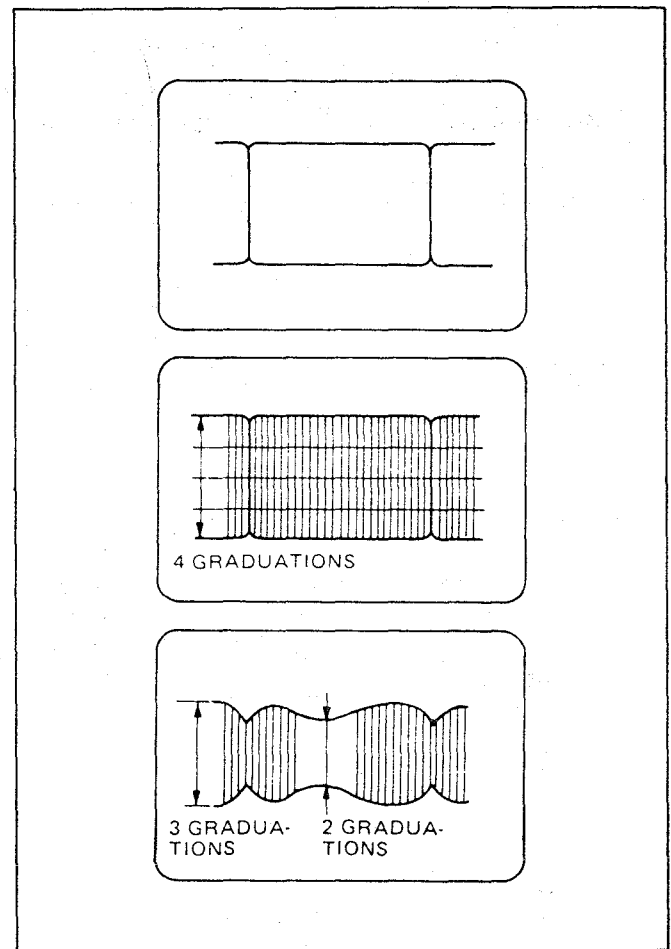


Fig. 3-13

3. TENSION AND TORQUE CHECKS

It is necessary to check the tension, torque and compression strength in the tape take-up section and moving section to smoothen the tape transport and to satisfy the basic performance of the VTR. When the tape transport is not

smooth or the tape speed is abnormal detect the faulty section by this checking, and then check again after replacing the faulty parts with normal ones to complete the work.

Item	VTR Operation Mode	Measured Reel	Measurement Value	Remarks
Main brake torque	STOP	Supply	140g. cm ~	Note 1
		Take-up	80g.cm ~	
Slack removal torque	UNLOADING	Supply	90 ~ 220g.cm	Note 1
Fast forward torque	F. FWD	Take-up	400g.cm ~	Note 1
Rewind torque	REW	Supply	400g.cm ~	Note 1
Take-up torque	PLAY	Take-up	80 ~ 100g.cm	Note 1
Back-tension torque	F. FWD	Supply	4 ~ 10g.cm	Note 2
	REW	Take-up		

Note 1: This is the value measured using the torque gauge and torque adapter while sliding the torque gauge at the speed of 0.8 rps. However, the main brake torque shows the value measured while moving the take-up reel clockwise and the supply reel counterclockwise by hand at the speed of 0.8 rps.

Note 2: This is the value measured using the dummy reel and fan type tension gauge while drawing the take-up reel disk counterclockwise and the supply reel disk clockwise at the speed of 50mm/s.

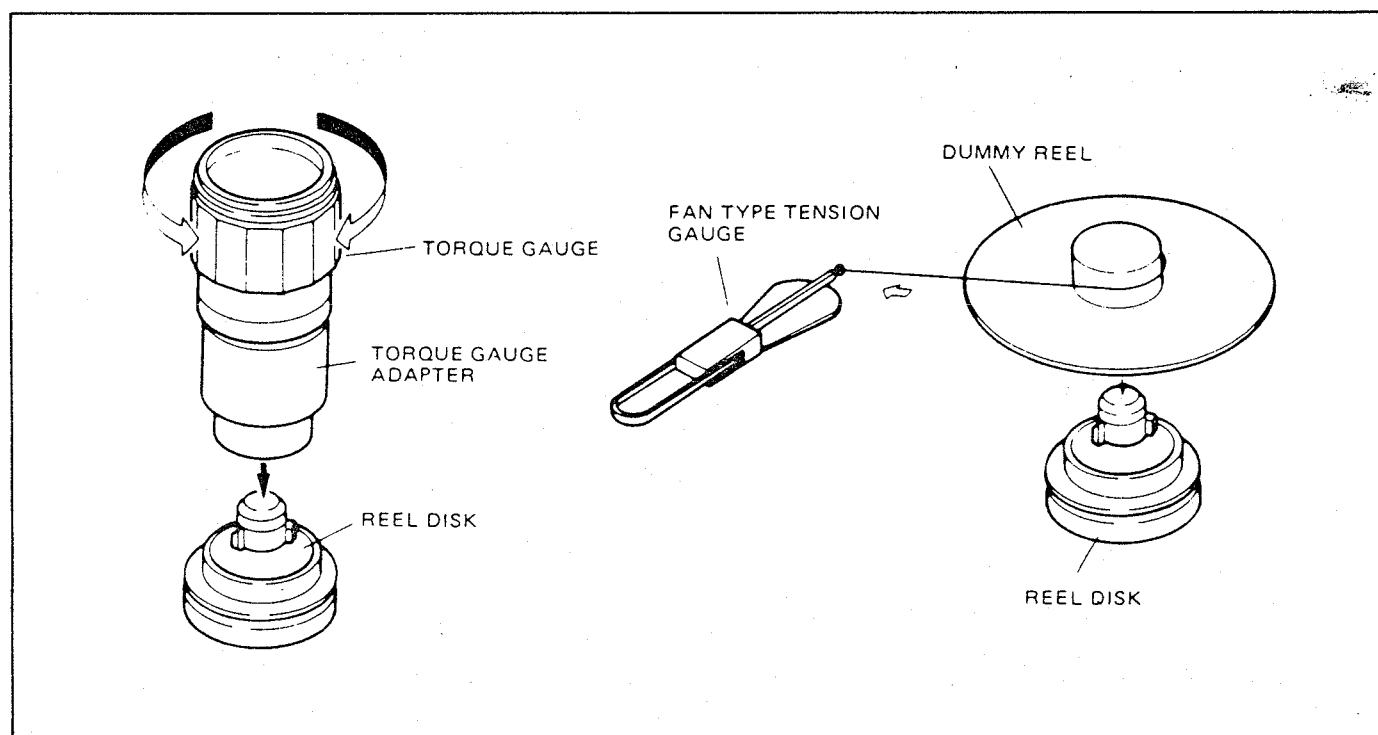


Fig. 3-14

ELECTRICAL ADJUSTMENT

SETTING OF VHS MOVIE

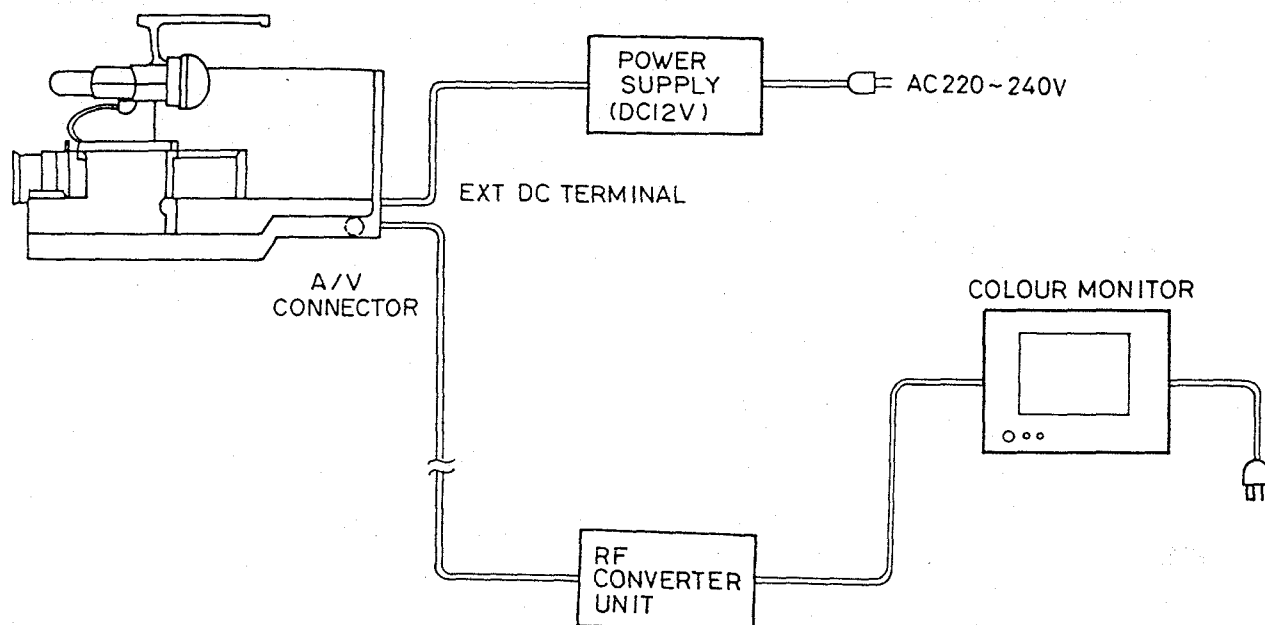


Fig. 4-1 Correct Setup Adjustment

CIRCUIT BOARDS LOCATION AND IDENTIFICATION

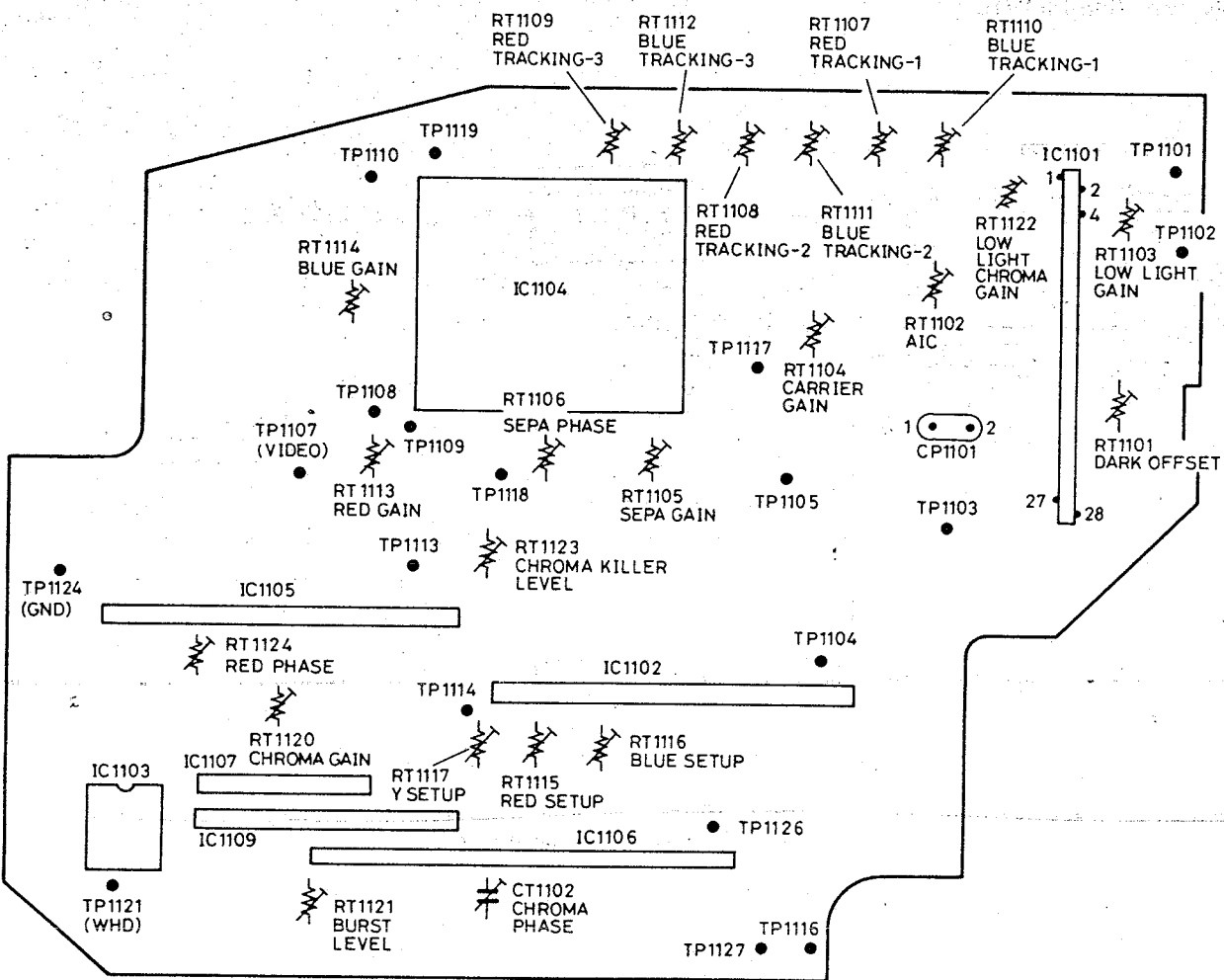


Fig. 4-2 Process Circuit Board (Component Side)

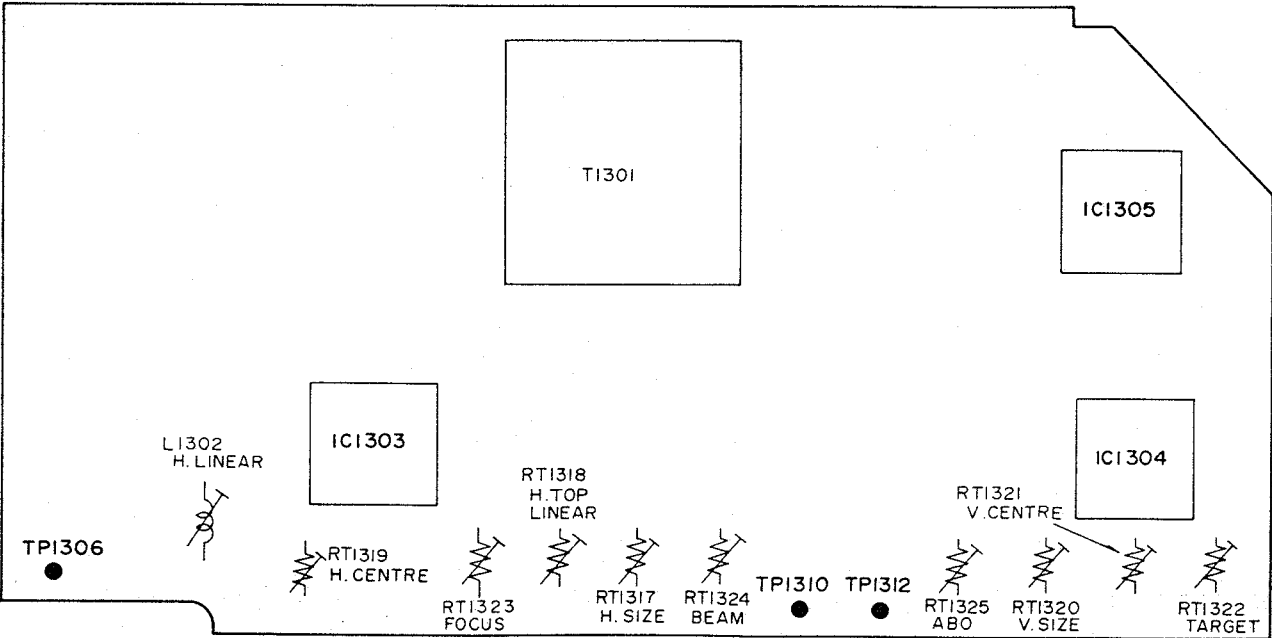


Fig. 4-3 Deflection Circuit Board (Component Side)

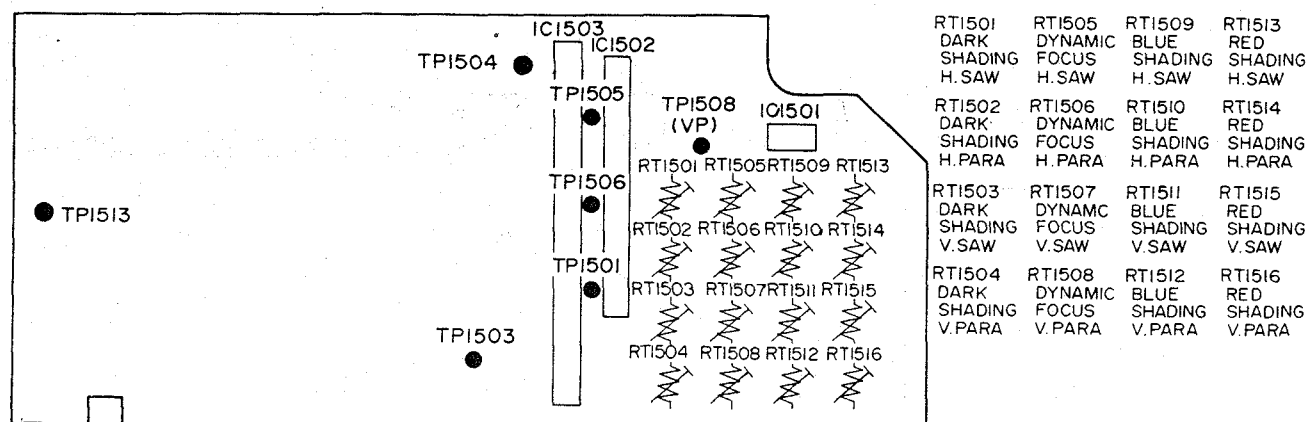


Fig. 4-4 Regulator Circuit Board (Solder Side)

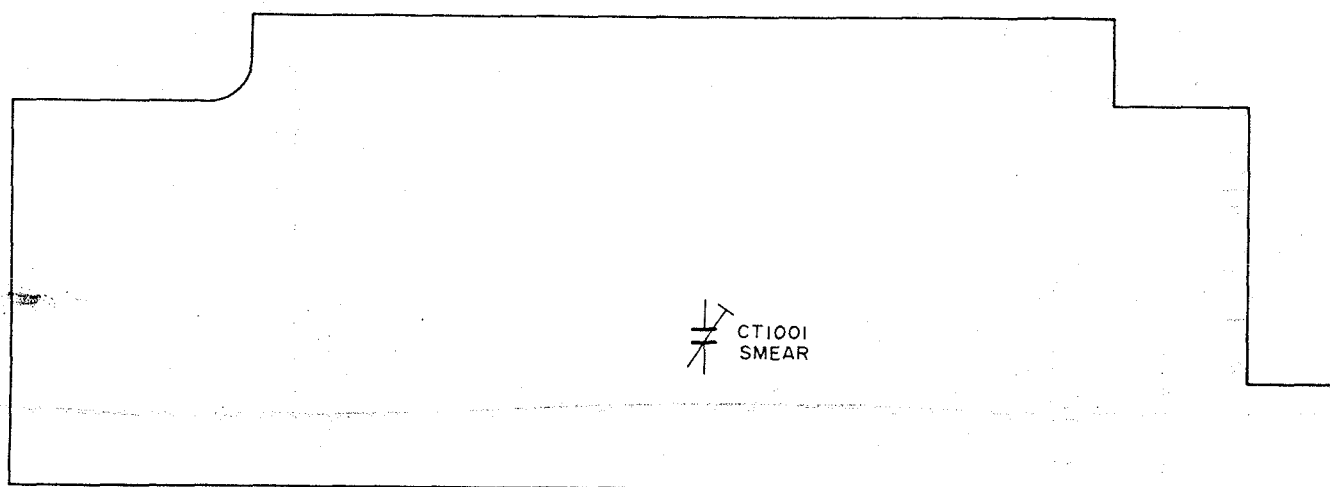


Fig. 4-5 Preamp Circuit Board (Solder Side)

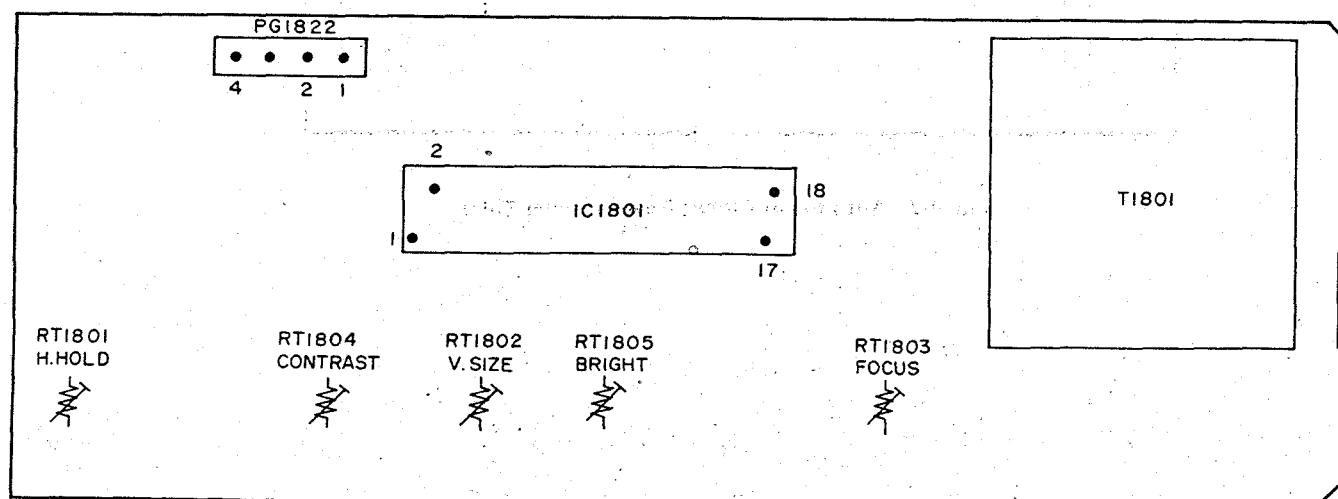


Fig. 4-6 Electronic Viewfinder Circuit Board (Component Side)

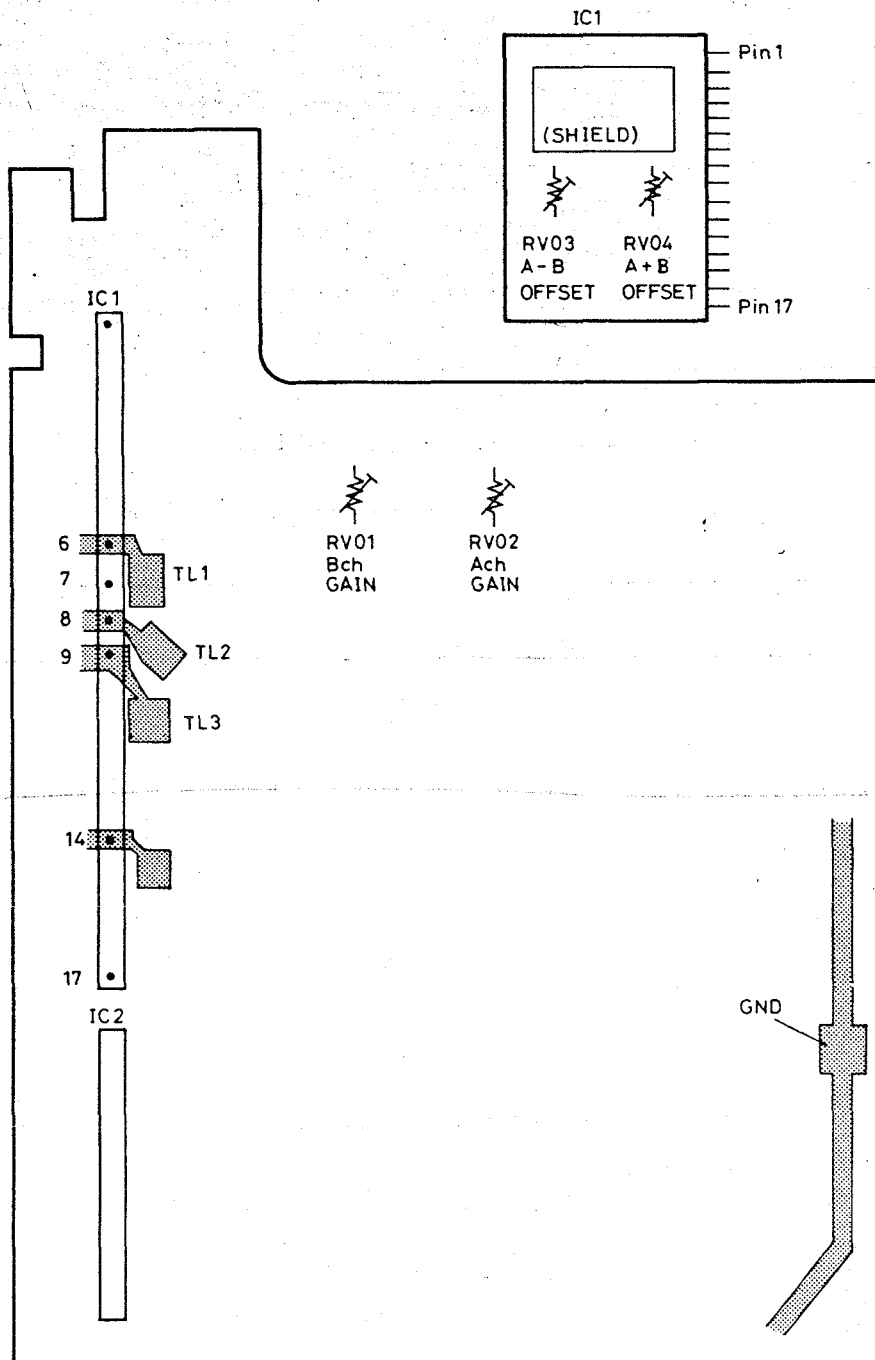


Fig. 4-7 Auto Focus Circuit Board (Solder Side)

CAMERA SECTION

TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of VHS MOVIE.

Oscilloscope (10:1 Probe)
Digital Voltmeter (DVM)
Frequency Counter
Vectorscope
Colour Video Monitor
Gray Scale Chart with 11 steps
3200°K Light Box
Colour Bar Chart
Light Meter
Backfocus Test Chart B
Adjustment Chart
Light balancing Filter (Parts No. 7099207)
DC Power Supply (12V)
Back Focus Adjustment Driver (Parts No. 7099205)

ADJUSTMENT CONDITIONS

Setting Up

Connect the VHS MOVIE and test equipment as shown in Fig. 4-1.

Mount the Light Balancing Filter (Parts No. 7099207) to the lens.

Aim the camera at the chart fully over the video period when otherwise not specified.

Preset Position of Customer Controls and Switches

VTR/CAMERA Switch CAMERA position
AUTO FOCUS Switch MANUAL position
IRIS Control CENTRE position
IRIS Switch AUTO position

White Balance Setup

1. Cap the lens.
2. Set the STAND-BY switch to OPERATE position.
3. Set the OPERATE button to "OFF".
4. Set the WHITE BAL switch to centre position.
5. Set the OPERATE button to "ON".
6. Connect the DVM to TP1117.
7. Adjust CHROMA KILLER LEVEL control (RT1123) for $2.42V \pm 0.01V$.
8. Set LOW LIGHT CHROMA GAIN control (RT1122) to mechanical centre position.

CAMERA ADJUSTMENTS

Dynamic Focus Release (Figs. 4-4, 4-8, 4-9, 4-10)

Test Point:

TP1503 (DYNAMIC FOCUS CORRECT)

Regulator

Adjust:

RT1505 (DYNAMIC FOCUS H. SAW)

Regulator

RT1506 (DYNAMIC FOCUS H. PARA)

Regulator

RT1507 (DYNAMIC FOCUS V. SAW)

Regulator

RT1508 (DYNAMIC FOCUS V. PARA)

Regulator

1. Close the lens.
2. Connect the oscilloscope to TP1503.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust DYNAMIC FOCUS H. SAW control (RT1505) and DYNAMIC FOCUS H. PARA control (RT1506) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust DYNAMIC FOCUS V. SAW control (RT1507) and DYNAMIC FOCUS V. PARA control (RT1508) to make the waveforms flat.

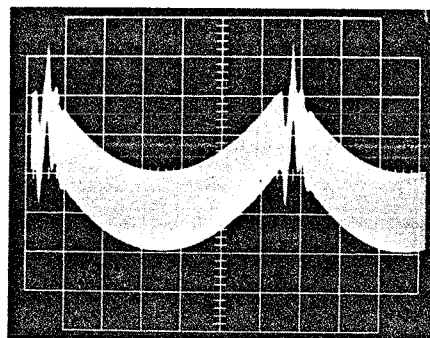


Fig. 4-8 Dynamic Focus Releasement

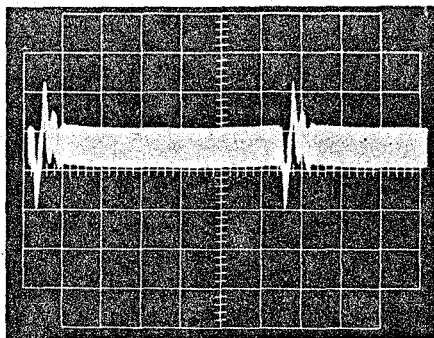


Fig. 4-9 Dynamic Focus Release

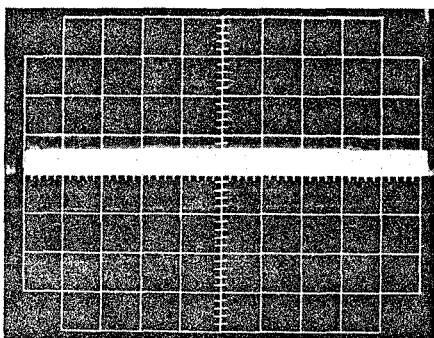


Fig. 4-10 Dyanmic Focus Release

8. Adjust RED SHADING V. SAW control (RT1515) and RED SHADING V. PARA control (RT1516) to make the waveforms at TP1505 flat.
9. Adjust BLUE SHADING V. SAW control (RT1511) and BLUE SHADING V. PARA control (RT1512) to make the waveforms at TP1504 flat.

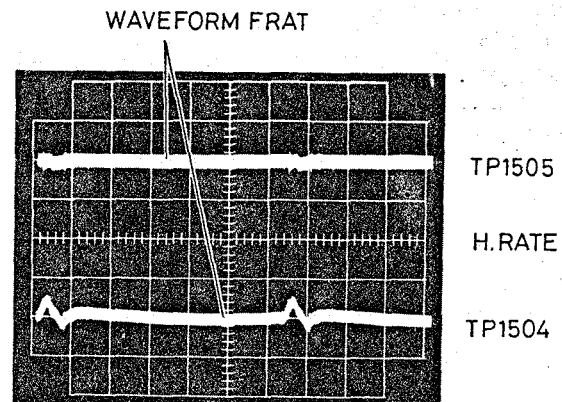


Fig. 4-11 R and B Signal Shading Release

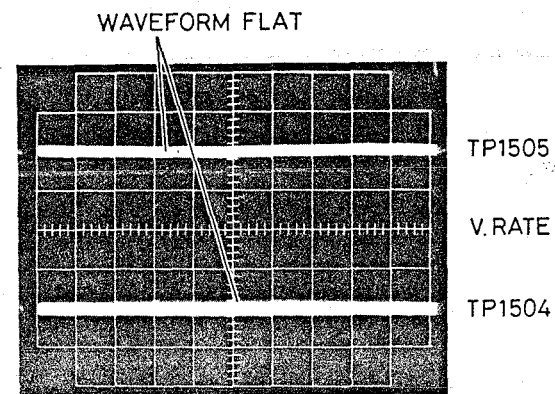


Fig. 4-12 R and B Signal Shading Release

R and B Signal Shading Release (Figs. 4-4, 4-11, 4-12)

Test Points:

TP1505 (RED SHADING CORRECT)	Regulator
TP1504 (BLUE SHADING CORRECT)	Regulator

Adjust:

RT1513 (RED SHADING H. SAW)	Regulator
RT1514 (RED SHADING H. PARA)	Regulator
RT1515 (RED SHADING V. SAW)	Regulator
RT1516 (RED SHADING V. PARA)	Regulator
RT1509 (BLUE SHADING H. SAW)	Regulator
RT1510 (BLUE SHADING H. PARA)	Regulator
RT1511 (BLUE SHADING V. SAW)	Regulator
RT1512 (BLUE SHADING V. PARA)	Regulator

1. Close the lens.
2. Connect the oscilloscope channel-1 to TP1505.
3. Connect the oscilloscope channel-2 to TP1504.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust RED SHADING H. SAW control (RT1513) and RED SHADING H. PARA control (RT1514) to make the waveforms at TP1505 flat.
6. Adjust BLUE SHADING H. SAW control (RT1509) and BLUE SHADING H. PARA control (RT1510) to make the waveforms at TP1504 flat.
7. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)

R and B Signal Tracking Release (Fig. 4-2)

Adjust: RT1112 (BLUE TRACKING-3)	Process
RT1111 (BLUE TRACKING-2)	Process
RT1110 (BLUE TRACKING-1)	Process
RT1109 (RED TRACKING-3)	Process
RT1108 (RED TRACKING-2)	Process
RT1107 (RED TRACKING-1)	Process

1. Close the lens.
2. Set BLUE TRACKING-3 control (RT1112), BLUE TRACKING-2 control (RT1111), BLUE TRACKING-1 control (RT1110), RED TRACKING-3 control (RT1109), RED TRACKING-2 control (RT1108) and RED TRACKING-1 control (RT1107) to their mechanical centres.

Target Voltage Adjustment (Fig. 4-3)

Test Point: TP1306 (TARGET)
Adjust: RT1322 (TARGET)

Deflection
Deflection

Loss of target voltage will cause a "no picture" condition.

1. Cap the lens.
2. Connect the DVM to TP1306.
3. Adjust TARGET control (RT1322) for $51V \pm 0.1V$.

AGC Maximum Gain Preset Adjustment (Fig. 4-2)

Test Point: TP1102
Adjust: RT1103 (LOW LIGHT GAIN)

Process
Process

1. Close the lens.
2. Connect the DVM to TP1102.
3. Adjust the LOW LIGHT GAIN control (RT1103) for $1.2V \pm 0.05V$.

Beam Current Adjustment (Figs. 4-2, 4-3, 4-13, 4-14)

Test Point: TP1101 (PRE-VIDEO)
Adjust: RT1324 (BEAM)
RT1325 (ABO)

Process
Deflection
Deflection

This procedure adjusts the electron beam by varying the G1 voltage. When the voltage is too high, the shading amount increases. When the voltage is too low the picture tends to "washout" or not appear at all.

Note: Perform this adjustment quickly with the lens cap removed after connecting all the measuring equipment, etc. with the lens capped. Cap the lens immediately after the adjustment is completed.

1. Aim the camera at adjustment chart.
2. Connect TP1116 to ground (TP1124).
3. Connect the oscilloscope to TP1101.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Turn AIC control (RT1102) fully counterclockwise (As seen from component side)
6. Adjust BEAM control (RT1324) until the waveform is clipped at $1.5V_{p-p} \pm 0.1V$ (Fig. 4-13).
7. Disconnect TP1116 from ground (TP1124).
8. Adjust ABO control (RT1325) until the waveform is clipped at $2.0V_{p-p} \pm 0.3V$ (Fig. 4-14).

Note: After adjustment is complete, turn RT1102 mechanical centre.

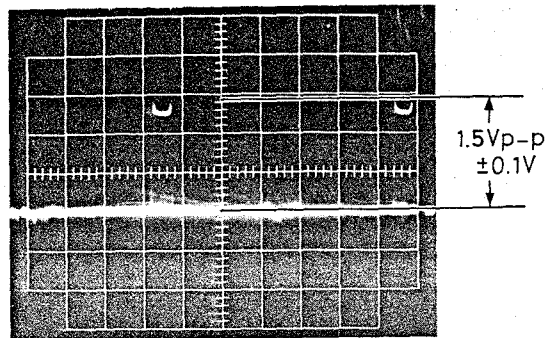


Fig. 4-13 Beam Current Adjustment

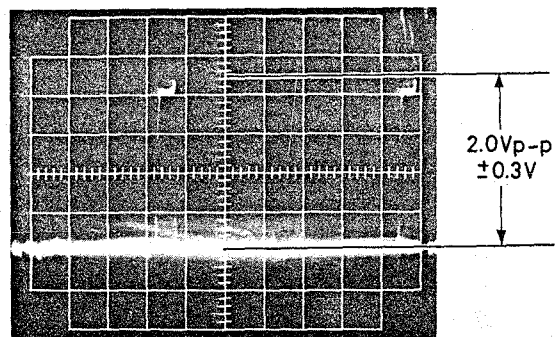


Fig. 4-14 Beam Current Adjustment

Smear Adjustment (Figs. 4-5, 4-15)

Adjust: CT1001 (SMEAR)

Preamp

Observe: Colour Monitor

1. Aim the camera at the gray scale chart.
2. Adjust SMEAR control (CT1001) to minimize smear in sections where black changes to gray and white changes to gray on the gray scale chart.

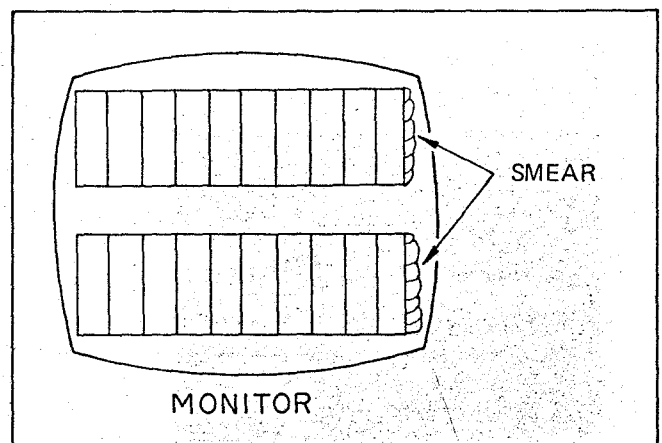


Fig. 4-15 Smear Adjustment

Dark Shading Adjustment (Figs. 4-2, 4-4, 4-16, 4-17)

Test Point: TP1103 (AGC OUT) Process
 Adjust: RT1501 (DARK SHADING H. SAW) Regulator
 RT1502 (DARK SHADING H. PARA) Regulator
 RT1503 (DARK SHADING V. SAW) Regulator
 RT1504 (DARK SHADING V. PARA) Regulator

This adjustment corrects shading of the bias light so that the whole picture becomes dark without colour noise when the camera is aimed at a dark place.

1. Close the lens.
2. Connect the oscilloscope to TP1103 via a resistor (18k ohm).
3. Trigger the oscilloscope at V.rate. (Use TP1508 on Regulator board.)
4. Adjust DARK SHADING V. SAW control (RT1503) and DARK SHADING V. PARA control (RT1504) so that the waveform is flat.
5. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
6. Adjust DARK SHADING H. SAW control (RT1501) and DARK SHADING H. PARA control (RT1502) so that the waveform is flat.

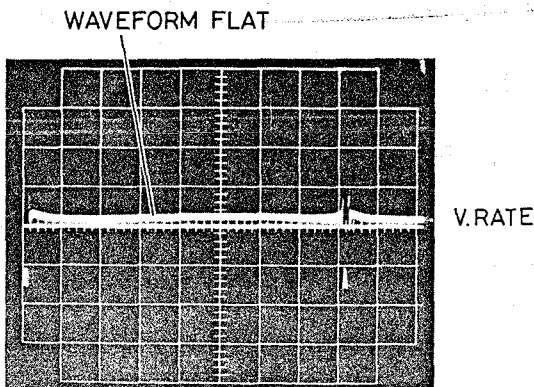


Fig. 4-16 Dark Shading Adjustment

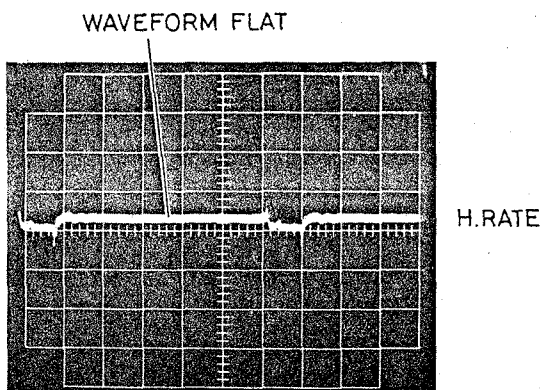


Fig. 4-17 Dark Shading Adjustment

Dark Offset Adjustment (Figs. 4-2, 4-18, 4-19)

Test Points: VIDEO OUTPUT (TP1107) Process
 TP1103 (AGC OUT) Process
 Adjust: RT1101 (DARK OFFSET) Process

This adjustment sets the black level.

1. Close the lens.
2. Connect the oscilloscope to TP1103 via resistor (18k ohm).
3. Trigger the oscilloscope at H.rate. (Use TP1121 on process board.)
4. Adjust AGC OFFSET control (RT1101) so that the centre at waveform matches the blanking level. (See Fig. 4-18)
5. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
6. Adjust Y SETUP control (RT1117) for $35.7\text{mVp-p} \pm 7\text{mV}$ from blanking level to the center of the waveform. (See Fig. 4-19)

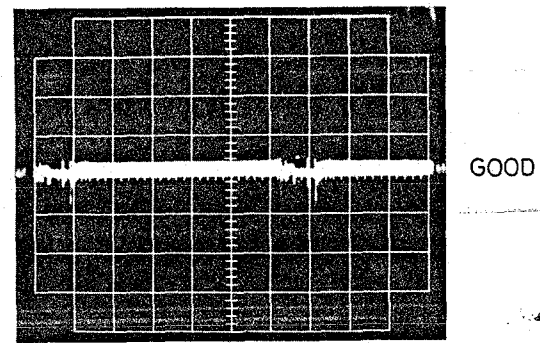


Fig. 4-18 Dark Offset Adjustment

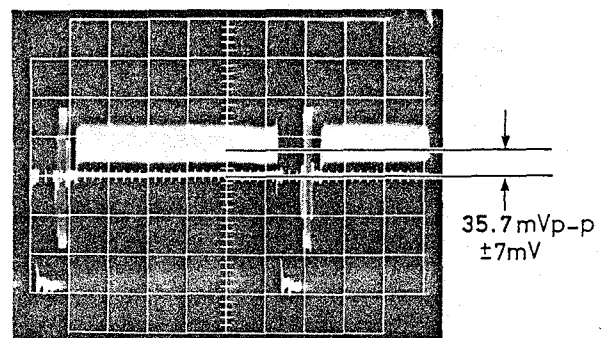


Fig. 4-19 Dark Offset Adjustment

AGC Maximum Gain Adjustment (Fig. 4-2)

Test Points: TP1102

Process

Adjust: RT1103 (LOW LIGHT GAIN)

Process

1. Close the lens.
2. Connect the DVM to TP1102.
3. Adjust the LOW LIGHT GAIN control (RT1103) for $1.20V \pm 0.05V$.

AIC Level Adjustment (Figs. 4-2, 4-20)

Test Point: VIDEO OUTPUT (TP1107)

Process

Adjust: RT1102 (AIC)

Make this adjustment to set the balance point of the automatic iris. Depending on the AIC setting (too high or too low), an incorrect adjustment could cause the image to appear dark or bright under normal lighting.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Turn CHROMA GAIN control (RT1120) fully counter-clockwise (as viewed from the component side).
5. Adjust AIC (RT1102) for $700mVp-p \pm 14mV$ the top of the gray scale waveform.

Note: After adjustment is complete, turn RT1120 mechanical centre.

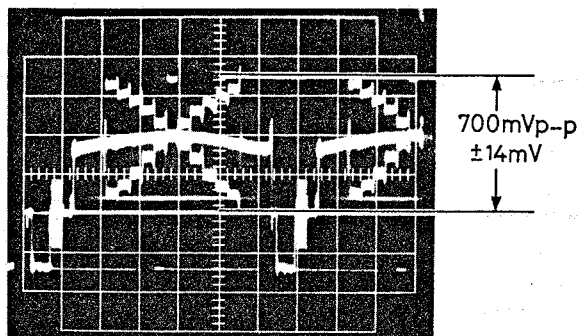


Fig. 4-20 AIC Level Adjustment

Backfocus Adjustment (Fig. 4-21)

The purpose of this adjustment is to ensure proper focus tracking throughout the zoom range.

1. Remove left case and right case.
2. Set chart illumination to 30 lux to 70 lux.
3. Aim the camera at the backfocus chart 2 meters away.
4. Set the focus ring to 2 meters position.
5. Loosen the hexagonal screw.
6. Zoom in (close up/telephoto) and adjust the lens focus.
7. Zoom out (wide angle) and insert the backfocus adjustment driver into the backfocus adjustment point and adjust the backfocus.
8. Zoom in again and adjust the lens focus.
9. Zoom out again and adjust the backfocus.
10. Repeat the procedure until the focus tracks throughout the zoom range.

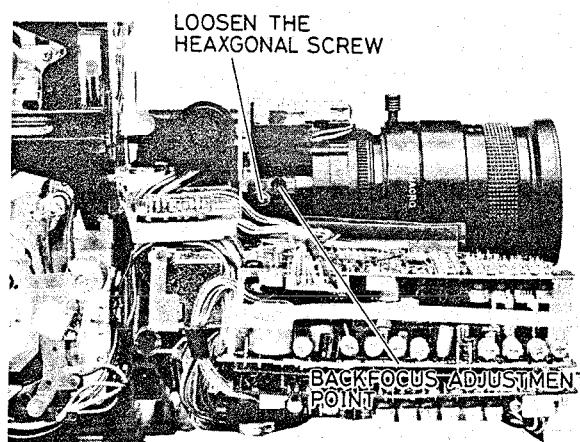


Fig. 4-21 Backfocus Adjustment

Chroma Carrier Level Adjustment (Figs. 4-2, 4-3, 4-22)

Test Point: TP1108 (CARRIER OUT) Process
Adjust: RT1323 (FOCUS) Deflection
RT1104 (CARRIER GAIN) Process

The purpose of this procedure is to adjust the saticon focus electrode voltage so the beam is focused on the photoconductive film and also to adjust the carrier level of the chroma signal. Incorrect carrier level setting can cause colour and tint problems.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to TP1108.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust FOCUS control (RT1323) so that the waveforms are maximum.
5. Adjust CARRIER GAIN control (RT1104) so that the waveform is $700\text{mVp-p} \pm 50\text{mV}$.

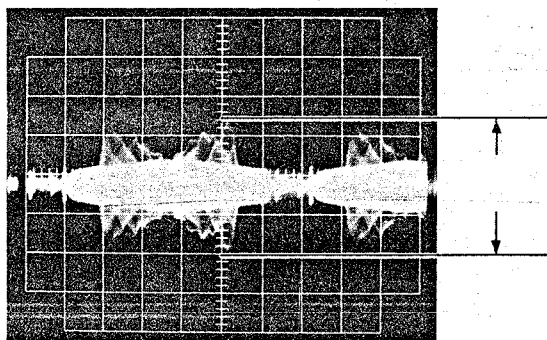


Fig. 4-22 Chroma Carrier Level Adjustment

Vertical Size Adjustment (Figs. 4-2, 4-3, 4-4, 4-23, 4-24)

Test Point: TP1108 (CARRIER OUT) Process
TP1513 (5V) Regulator
TP1310 Deflection
Adjust: RT1320 (V. SIZE) Deflection

This adjustment sets the proper vertical scanning of the saticon. Improper adjustment could cause distorted images (circle becoming an ellipse) or a space at the top or bottom of the picture.

1. Marking the center on the monitor screen.
2. Connect TP1310 and TP1513.
3. Adjust V.CENTER (RT1321) so that the centre mark came to the centre of the screen.
4. Remove the short circuit between TP1310 and TP1513.
5. Aim the camera at the light box (white chart).
6. Connect the oscilloscope to TP1108.
7. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
8. Adjust V. SIZE control (RT1320) for minimum beats during the vertical period. (Figs. 4-23, 4-24)

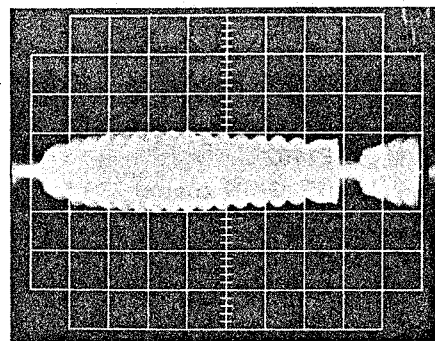


Fig. 4-23 Vertical Size Adjustment

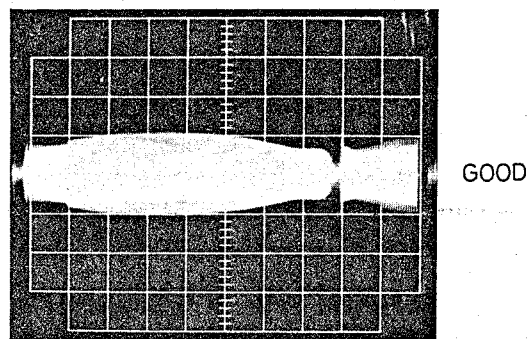


Fig. 4-24 Vertical Size Adjustment

Horizontal Size and Horizontal Linearity Adjustment

(Figs. 4-2, 4-3, 4-25, 4-26, 4-27)

Test Point: CP1101-1 Process
Adjusts: RT1317 (H. SIZE) Deflection
RT1318 (H. TOP LINEAR) Deflection
L1302 (H. LINEAR) Deflection

The purpose of this adjustment is to set the proper horizontal scanning of the saticon. Improper adjustment could cause distorted images or the colour balance to shift (probably to green).

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope to CP1101-1.
3. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
4. Delay the waveform and observe its centre.
5. Adjust H. SIZE control (RT1317) so that the carrier in the centre portion of the signal at CP1101-1 is minimum.
6. Adjust H. TOP LINEAR control (RT1318) for minimum carrier over the wheel Y signal. Adjust H. LINEAR control (L1302) so the carrier at the starting portion of Y signal at point CP1101-1 is minimum, and the starting portion of Y signal becomes as flat as possible.

Note: When use the oscilloscope not provided a delay function adjust items 5 and 6 with triggering the oscilloscope at H. rate.

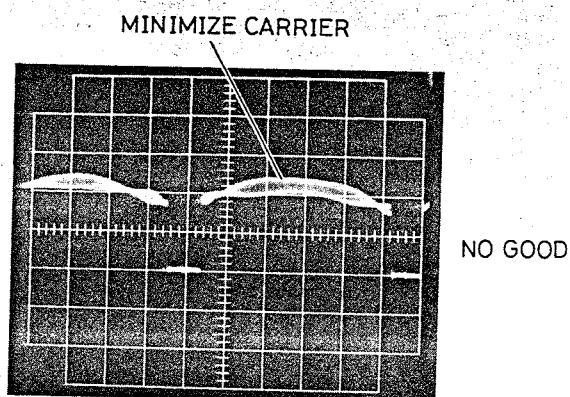


Fig. 4-25 Horizontal Size and Linearity Adjustment

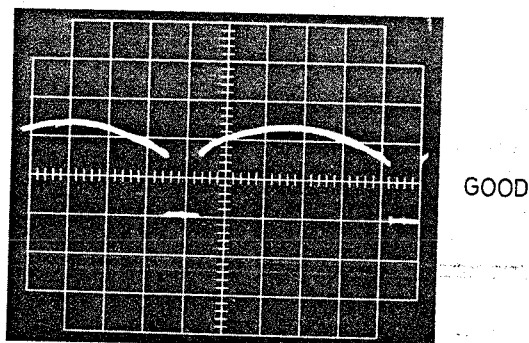


Fig. 4-26 Horizontal Size and Linearity Adjustment

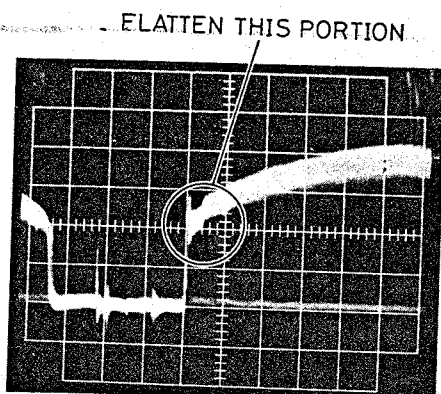


Fig. 4-27 Horizontal Size and Linearity Adjustment

Horizontal Centre and Vertical Centre Adjustment (Figs. 4-3, 4-4)

Adjust:	RT1319 (H. CENTRE)	Deflection
	RT1321 (V. CENTRE)	Deflection
Test Points:	TP1310	Deflection
	TP1312	Deflection
	TP1513 (5V)	Regulator
Observe:	Colour Monitor	

This adjustment determines the horizontal and vertical deflection positions in the saticon. If misadjusted a space could appear on either side of the picture.

*Vertical Center Adjustment

1. Marking the centre on the monitor screen.
2. Connect TP1310 and TP1513.
3. Adjust V. CENTRE (RT1321) so that the centre mark come to the centre of the screen.
4. Remove shout circuit between TP1310 and TP1513.

*Horizontal Centre Adjustment

1. Marking the centre on the monitor screen.
2. Connect TP1312 and TP1513.
3. Adjust H. CENTRE (RT1319) so that the centre mark come to the centre of the screen.
4. Remove shout circuit between TP1312 and TP1513.

Chroma Setup Preset Adjustment (Figs. 4-2, 4-28)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1115 (RED SETUP)	Process
	RT1116 (BLUE SETUP)	Process

This adjustment makes the picture black without colour noise when the camera is aimed at a dark place.

1. Close the lens.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE SETUP control (RT1116) so that the chroma level at TP1114 matches become a little bit lower than the blanking level.
6. Adjust RED SETUP control (RT1115) so that the chroma level at TP1113 matches become a little bit lower than the blanking level.

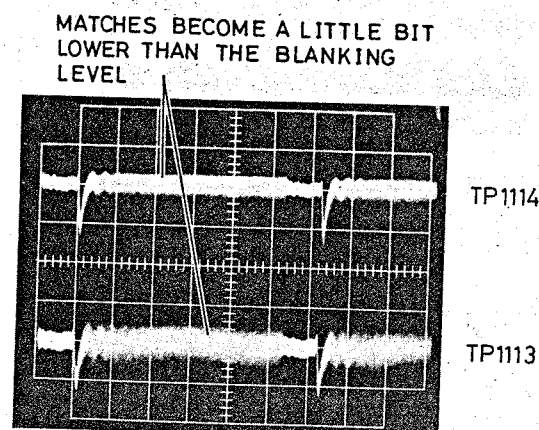


Fig. 4-28 Chroma Setup Preset Adjustment

R and B Signal Gain and Separation Preset Adjustment

1) R and B Signal Separation Preset Adjustment (Figs. 4-2, 4-29)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1105 (SEPA GAIN)	Process
	RT1106 (SEPA PHASE)	Process

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust SEPA PHASE control (RT1106) and SEPA GAIN control (RT1105) for minimum flicker in the waveforms.

2) R and B Signal Gain Preset Adjustment (Figs. 4-2, 4-30)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1114 (BLUE GAIN)	Process
	RT1113 (RED GAIN)	Process

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE GAIN control (RT1114) so that the average of chroma level at TP1114 matches the blanking level.
6. Adjust RED GAIN control (RT1113) so that the average of chroma level at TP1113 matches the blanking level.

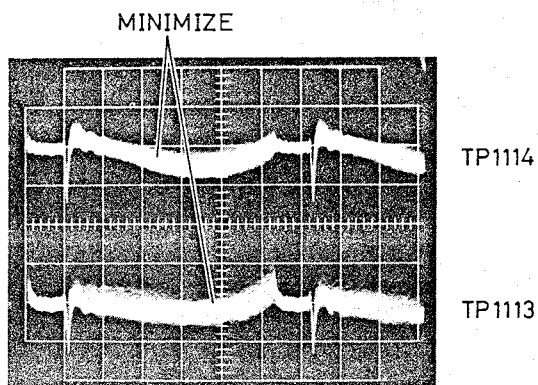


Fig. 4-29 R and B Signal Separation Preset Adjustment

MATCHES BLANKING LEVEL

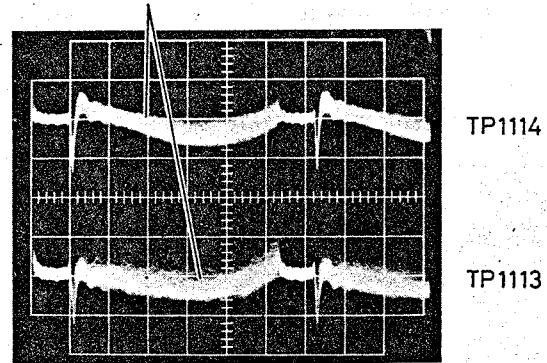


Fig. 4-30 R and B Signal Gain Preset Adjustment

Focus Preset Adjustment (Figs. 4-2, 4-3, 4-31)

Test Points:	TP1109 (RED SIGNAL)	Process
	TP1110 (BLUE SIGNAL)	Process
Adjust:	RT1323 (FOCUS)	Deflection

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1109.
3. Connect the oscilloscope channel-2 to TP1110.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust FOCUS control (RT1323) according to priority of procedure (1) to (3).
 - (1) First through sixth steps from the bottom of waveform are maximum.
 - (2) Make the gray scale level of waveform parallel to the black level and maximize the amplitude.
 - (3) Make the right and left of the waveform well-balanced and improve.
 - (4) The second step of gray scale should be adjusted higher as possible as you can.

Note 1: It is desirable so that the waveforms at TP1109 and TP1110 are the same for this adjustment. If they differ, select the waveform that is greatly changed when RT1323 is turned and perform this adjustment.

Note 2: When the waveform fluctuates regardless of correct synchronization during the above adjustment, adjust RT1105 and RT1106 so that fluctuations of the waveform become small and then adjust RT1323.

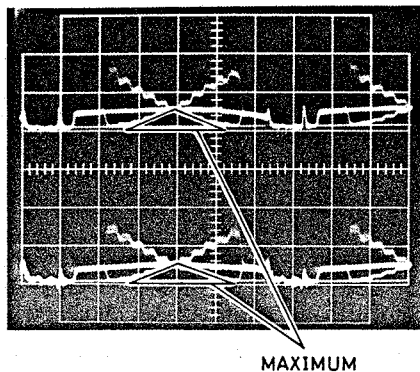


Fig. 4-31 Focus Preset Adjustment

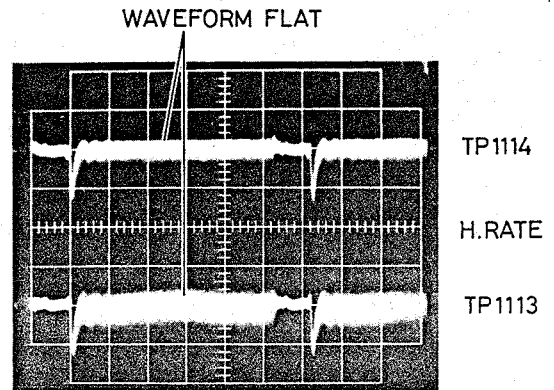


Fig. 4-32 Dynamic Focus Preset Adjustment

Dynamic Focus Adjustment (Figs. 4-2, 4-4, 4-32, 4-33)

Test Points:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1505 (DYNAMIC FOCUS H. SAW)	Regulator
	RT1506 (DYNAMIC FOCUS H. PARA)	Regulator
	RT1507 (DYNAMIC FOCUS V. SAW)	Regulator
	RT1508 (DYNAMIC FOCUS V. PARA)	Regulator

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust DYNAMIC FOCUS H. SAW control (RT1505) and DYNAMIC FOCUS H. PARA control (RT1506) to make the waveforms flat.
6. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
7. Adjust DYNAMIC FOCUS V. SAW control (RT1507) and DYNAMIC FOCUS V. PARA control (RT1508) to make the waveforms flat.
8. Repeat this adjustment.

Note: When flattening the waveform in the above adjustment, smooth both ends of the waveform and make the overall waveform similar to the sawtooth or parabolic waveform.

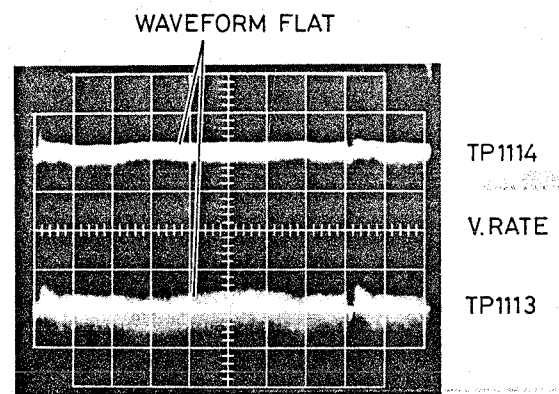


Fig. 4-33 Dynamic Focus Preset Adjustment

Focus Adjustment (Figs. 4-2, 4-4, 4-34)

Test Points:	TP1109 (RED SIGNAL)	Process
	TP1110 (BLUE SIGNAL)	Process
Adjust:	RT1323 (FOCUS)	Deflection

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1109.
3. Connect the oscilloscope channel-2 to TP1110.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust FOCUS control (RT1323) according to priority of procedure (1) to (3).

- (1) First though sixth steps from the bottom of waveform are maximum.
- (2) Make the gray scale level of waveform parallel to the black level and maximize the amplitude.
- (3) Make the right and left of the waveform well balance and improve.
- (4) The second step of gray scale should be adjust higher as possible as you can.

Note: Take care so the tip of the waveform is not crashed during this adjustment.

Note 1: It is desirable so that the waveforms at TP1109 and TP1110 are the same for this adjustment. If

they differ, select the waveform that is greatly changed when RT1323 is turned and perform this adjustment.

Note 2: When the waveform fluctuates regardless of correct synchronization during the above adjustment, adjust RT1105 and RT1106 so that fluctuations of the waveform becomes small and then adjust RT1323.

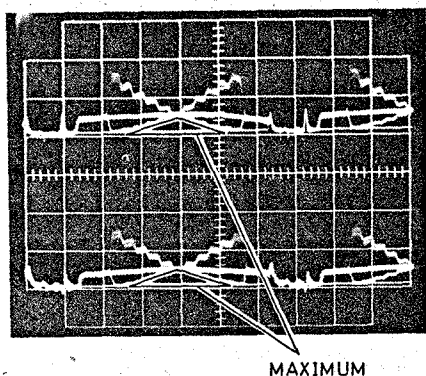


Fig. 4-34 Focus Adjustment

R and B Signal Shading Adjustment

1) R Signal Shading Adjustment (Figs. 4-2, 4-4, 4-35, 4-36)

Test Point:	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1513 (RED SHADING H. SAW)	Regulator
	RT1514 (RED SHADING H. PARA)	Regulator
	RT1515 (RED SHADING V. SAW)	Regulator
	RT1516 (RED SHADING V. PARA)	Regulator

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope to TP1113.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust RED SHADING H. SAW control (RT1513) and RED SHADING H. PARA control (RT1514) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust RED SHADING V. SAW control (RT1515) and RED SHADING V. PARA control (RT1516) to make the waveforms flat.

2) B Signal Shading Adjustment (Figs. 4-2, 4-4, 4-35, 4-36)

Test Point:	TP1114 (B-YL SIGNAL)	Process
Adjust:	RT1509 (BLUE SHADING H. SAW)	Regulator
	RT1510 (BLUE SHADING H. PARA)	Regulator
	RT1511 (BLUE SHADING V. SAW)	Regulator
	RT1512 (BLUE SHADING V. PARA)	Regulator

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope to TP1114.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust BLUE SHADING H. SAW control (RT1509) and BLUE SHADING H. PARA control (RT1510) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust BLUE SHADING V. SAW control (RT1511) and BLUE SHADING V. PARA control (RT1512) to make the waveforms flat.

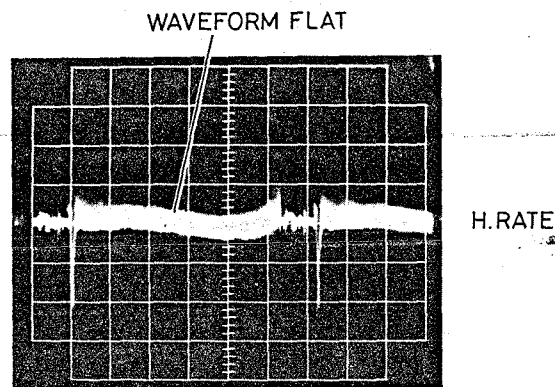


Fig. 4-35 R and B Signal Shading Adjustment

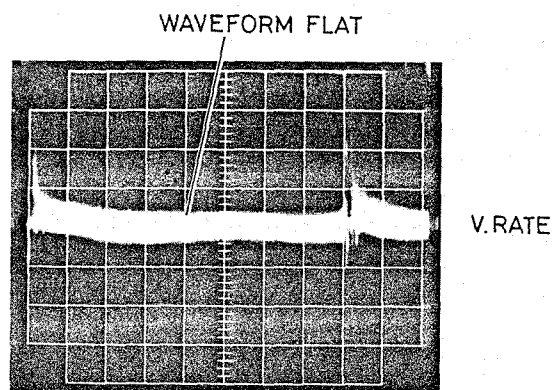


Fig. 4-36 R and B Signal Shading Adjustment

R and B Signal Separation Adjustment (Figs. 4-2, 4-37)

Test Points:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1105 (SEPA GAIN)	Process
	RT1106 (SEPA PHASE)	Process

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust SEPA PHASE control (RT1106) and SEPA GAIN control (RT1105) for minimum flicker in the waveform.

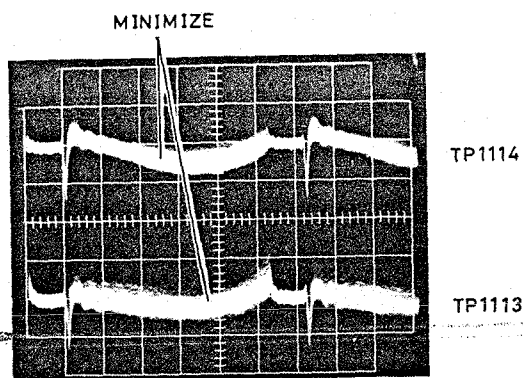


Fig. 4-37 R and B Signal Separation Adjustment

Dark Shading Confirmation (Figs. 4-2, 4-16, 4-17)

Test Point:	TP1103 (AGC OUT)	Process
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1. Close the lens.
2. Connect the oscilloscope to TP1103 via resistor (18k ohm).
3. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
4. Confirm that the waveform is flat.
5. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
6. Confirm that the waveform is flat.

Note: If it is not flat, readjust Dark Shading Adjustment.

Dark Offset Confirmation (Figs. 4-2, 4-18, 4-19)

Test Point:	VIDEO OUT (TP1107)	Process
	TP1103 (AGC OUT)	Process

1. Close the lens.
2. Connect the oscilloscope to TP1103 via resistor (18k ohm).
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Confirm that the centre of waveform matches the blanking level.
5. Connect the oscilloscope to VIDEO OUT (TP1107).
6. Confirm that the waveform is $35.7 \text{ mVp-p} \pm 7 \text{ mV}$.

Note: If it is not within range, readjust Dark Offset Adjustment.

Chroma Setup Adjustment (Figs. 4-2, 4-38)

Test Points:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1115 (RED SETUP)	Process
	RT1116 (BLUE SETUP)	Process

1. Close the lens.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE SETUP control (RT1116) so that the chroma level at TP1114 matches become a little bit lower than the blanking level.
6. Adjust RED SETUP control (RT1115) so that the chroma level at TP1113 matches become a little bit lower than the blanking level.

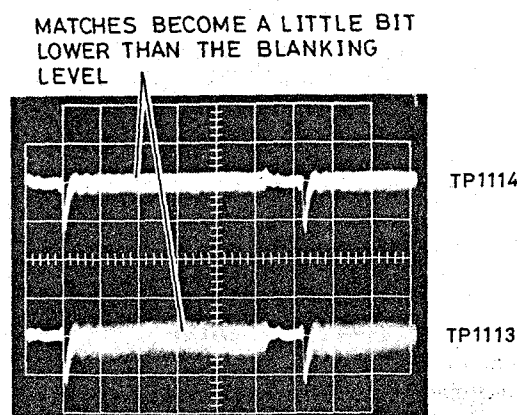


Fig. 4-38 Chroma Setup Adjustment

R and B Signal Gain Adjustment (Figs. 4-2, 4-39)

Test Points:	TP1114 (R-YL SIGNAL)	Process
	TP1113 (B-YL SIGNAL)	Process
Adjust:	RT1114 (BLUE GAIN)	Process
	RT1113 (RED GAIN)	Process

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE GAIN control (RT1114) so that the average of chroma level at TP1114 matches the blanking level.
6. Adjust RED GAIN control (RT1113) so that the average of chroma level at TP1113 matches the blanking level.

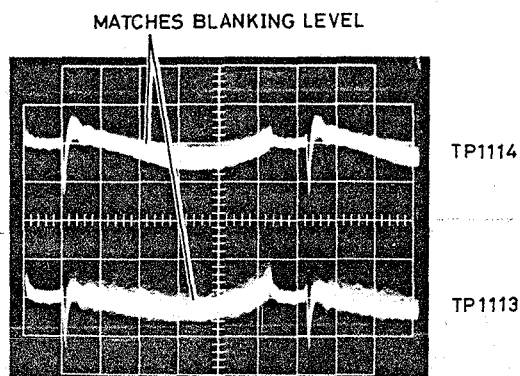


Fig. 4-39 R and B Signal Gain Adjustment

ING 1 control (RT1110) to make the waveforms flat and match the blanking level at TP1114.

6. Adjust RED TRACKING 3 control (RT1109), RED TRACKING 2 control (RT1108) and RED TRACKING 1 control (RT1107) to make the waveforms flat and match the blanking level.
7. Adjust RED TRACKING 3 control (RT1109) so that the blank at the bottom step of the gray scale chart on the monitor screen is seen the black.
8. Connect VIDEO OUTPUT terminated vectorscope.
9. Adjust RED GAIN control (RT1113) and BLUE GAIN control so the bright portion of the vector remains in the centre of the vectorscope screen.
10. Perform the adjustment procedures 5 through 8 repeatedly.

* Adjustment using oscilloscope (Figs. 4-40)

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE TRACKING 3 control (RT1112), BLUE TRACKING 2 control (RT1111) and BLUE TRACKING 1 control (RT1110) to make the waveforms flat and match the blanking level.
6. Adjust RED TRACKING 1 control (RT1107), RED TRACKING 2 control (RT1108) and RED TRACKING 3 control (RT1109) to make the waveforms flat and match the blanking level.
7. Adjust RED TRACKING 3 control (RT1109) so that the black at the bottom step of the gray scale chart on the monitor screen is seen the black.
8. Adjust RED GAIN control (RT1113) and BLUE GAIN control to make the waveforms matches blanking level at TP1113 and TP1114.
9. Perform the adjustment procedures 5 through 8 repeatedly.

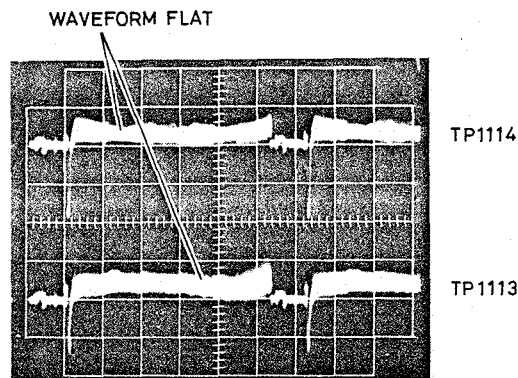


Fig. 4-40 R and B Signal Tracking Adjustment

R and B Signal Tracking Adjustment (Figs. 4-2, 4-40, 4-41)

Test Points:	VIDEO OUTPUT	
	TP1114 (B-YL SIGNAL)	Process
	TP1113 (B-YL SIGNAL)	Process
Adjust:	RT1107 (RED TRACKING 1)	Process
	RT1108 (RED TRACKING 2)	Process
	RT1109 (RED TRACKING 3)	Process
	RT1110 (BLUE TRACKING 1)	Process
	RT1111 (BLUE TRACKING 2)	Process
	RT1112 (BLUE TRACKING 3)	Process
	RT1113 (RED GAIN)	Process
	RT1114 (BLUE GAIN)	Process

* Adjustment using vectorscope (Figs. 4-40, 4-41)

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE TRACKING 3 control (RT1112), BLUE TRACKING 2 control (RT1111) and BLUE TRACK-

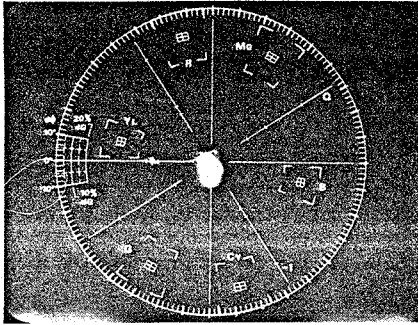


Fig. 4-41 R and B Signal Tracking Adjustment

Burst Level Adjustment (Figs. 4-2, 4-42)

Test Point: VIDEO OUTPUT (TP1107) Process
Adjust: RT1121 (BURST LEVEL) Process

This adjustment determines the position of colour saturation.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust BURST LEVEL control (RT1121) for $280\text{mVp-p} \pm 15\text{mV}$ to the burst level of gray scale waveform.

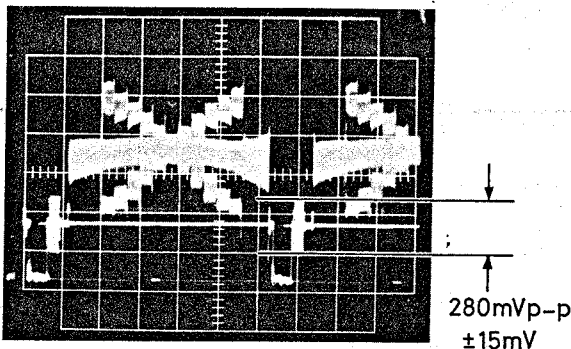


Fig. 4-42 Burst Level Adjustment

Chroma Gain and Flicker Cancel Adjustment (Figs. 4-2, 4-43, 4-44)

Test Point: VIDEO OUTPUT (TP1107) Process
Adjust: RT1120 (CHROMA GAIN) Process
 CT1102 (BURST PHASE) Process
Observe: Monitor TV

* Adjustment using vectorscope (Fig. 4-43)

1. Aim the camera at the colour bar chart.
2. Set the white balance.

3. Connect VIDEO OUTPUT terminated vectorscope.
4. Adjust CHROMA GAIN control (RT1120) so that the red vector is equal to $180\% \pm 10\%$ when compared to the burst level.
5. Adjust the BURST PHASE control (CT1102) so that two bright points of cyan became one on the vectorscope.

* Adjustment using oscilloscope and monitor TV (Fig. 4-44)

1. Aim the camera at the colour bar chart.
2. Set the white balance.
3. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust CHROMA GAIN control (RT1120) so the red signal level of the waveform is $510\text{mVp-p} \pm 25\text{mV}$.
6. Adjust BURST PHASE control (CT1102) to minimize flicker on the monitor screen.

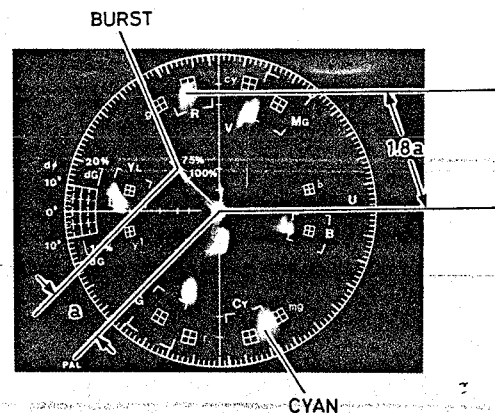


Fig. 4-43 Chroma Gain and Flicker Cancel Adjustment

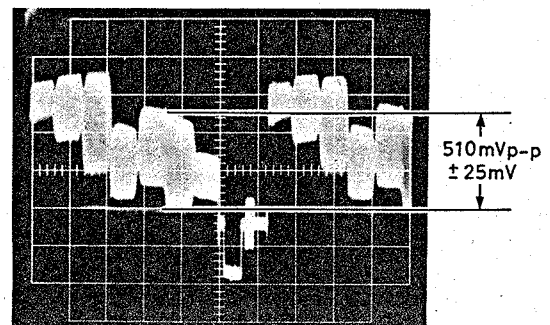


Fig. 4-44 Chroma Gain and Flicker Cancel Adjustment

Red Phase Adjustment (Figs. 4-2, 4-45)

Test Point: VIDEO OUTPUT (PAL OUT)

Adjust: RT1124 (RED PHASE)

Observe: Monitor TV

Process

* Adjustment using vectorscope

1. Aim the camera at the colour bar chart.
2. Connect the VIDEO OUTPUT terminated vectorscope.
3. Adjust RED PHASE control (RT1124) so that the red vector phase is $104^\circ \pm 2^\circ$.
4. Confirm the yellow vector equal to $105\% \pm 20\%$ when compared to the burst level.
5. If the value is in excess of the specified, readjust as follows.

More than 125%:

Adjust RED PHASE control (RT1124) so that the yellow vector equal to 125% when compared to the burst level.

Less than 85%:

Adjust RED PHASE control (RT1124) so that the yellow vector equal to 85% when compared to the burst level.

6. Confirm the red vector phase is $100^\circ \pm 15^\circ$.

* Adjustment using oscilloscope and monitor TV

1. Aim the camera at the colour bar chart.
2. Adjust RED PHASE control (RT1124) so that the tint of the red of the both the TV screen and colour bar chart match as much as possible.

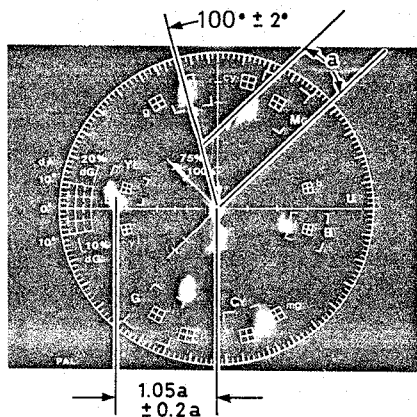


Fig. 4-45 Red Phase Adjustment

Low Light Chroma Gain Adjustment (Figs. 4-2, 4-46)

Test Point: TP1117

Process

Adjust: RT1122 (LOW LIGHT CHROMA GAIN)

Process

RT1123 (CHROMA KILLER LEVEL) Process

Observe: Colour Monitor

This adjustment sets colouring low illumination.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to TP1117.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust LOW LIGHT CHROMA GAIN control (RT1122) so that the waveform is $200\text{mVp-p} \pm 10\text{mV}$.
5. Aim the camera at a dark place with approx. 20 lux.
6. Set CHROMA KILLER LEVEL control (RT1123) to a position where noise on the monitor screen start to increase abruptly.

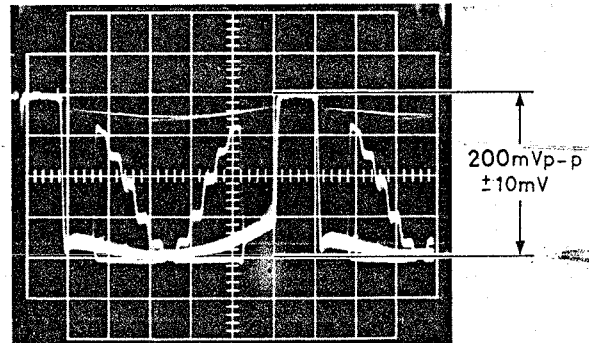


Fig. 4-46 Low Light Chroma Gain Adjustment

White Balance Confirmation

1. Switch the White Balance Control "Auto", and if the picture is greatly different from that when the control is in the "Manual" position, adjust the following.

Chroma Setup Adjustment

R and B Signal Tracking Adjustment

Chroma Gain and Phase Adjustment

VIEWFINDER ADJUSTMENTS

The conditions and connections for viewfinder adjustment are the same as shown in Fig. 4-1.

Horizontal Hold Adjustment (Figs. 4-8, 4-50)

Test Point: TP1801 (TP1802) Electronic Viewfinder
Adjust: RT1801 (H. HOLD) Electronic Viewfinder

This procedure sets the horizon sync frequency during VTR playback.

1. Connect the frequency counter to IC1801-2 on the electronic viewfinder board.
2. Set the H. HOLD (RT1801) to mechanical center.
3. Connect a capacitor ($47\mu\text{F}$) between pins 1 and 2 of PG1822 (TP1801).
4. Adjust H. HOLD (RT1801) for 15.75 ± 0.1 kHz.
5. Disconnect the capacitor connected between pins 1 and 2 of PG1822.

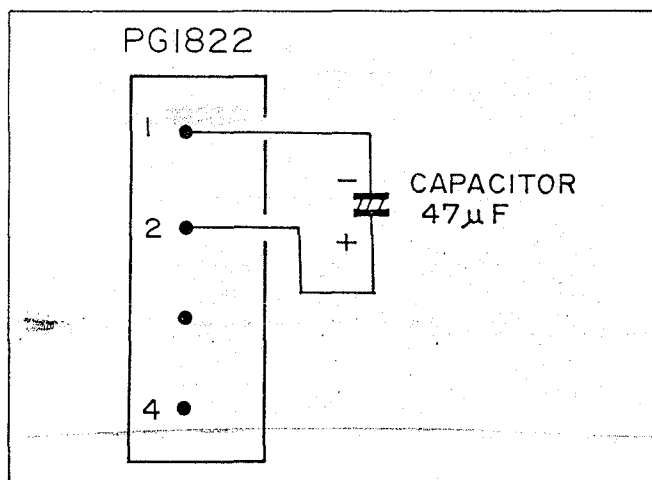


Fig. 4-50. Horizontal Hold Adjustment

Picture Tilt Adjustment (Fig. 4-51)

Adjust: Deflection Coil
Observe: Viewfinder

This procedure is used to set the picture tilt of the EVF image.

1. Make sure the camera is aligned with the chart.
2. Loosen the deflection coil holding screw.
3. Observe the viewfinder, and turn the deflection coil until the image is straight.
4. Tighten the screw holding the deflection coil.

Centering Magnets Adjustment (Fig. 4-51)

Adjust: Centring Magnets
Observe: Viewfinder

This adjustment sets the centre of the image picked up by the camera to the centre of the EVF screen.

1. Aim the camera at a resolution chart.
2. Adjust the centring magnets until the centre of the picture (+) comes to the centre of viewfinder raster.

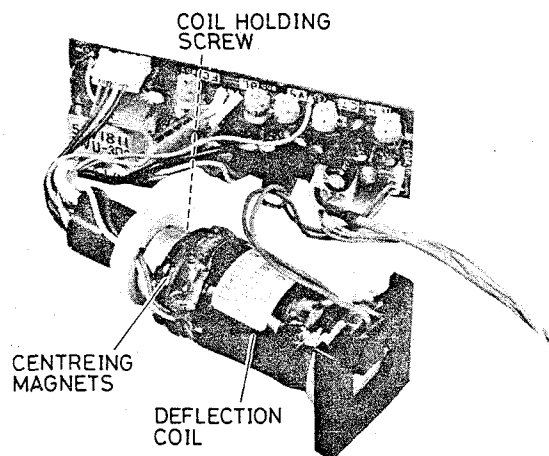


Fig. 4-51 Picture Tilt and Centering Magnets Adjustment

Vertical Size Adjustment (Fig. 4-8)

Adjust: RT1802 (V. SIZE) Electronic Viewfinder
Observe: Viewfinder

This adjustment determines the vertical deflection size.

1. Aim the camera at a resolution chart, and line up the reference arrow head with the edge of the raster (blanking) in the EVF.
2. Adjust V. SIZE (RT1802) so that the circle in the chart is round.

Focus Adjustment (Fig. 4-8)

Adjust: RT1803 (FOCUS) Electronic Viewfinder
Observe: Viewfinder

This adjustment sets the focus so that sharpness of the picture is best.

1. Aim the camera at the resolution chart.
2. Adjust FOCUS (RT1803) for the best resolution in the viewfinder.

Contrast and Brightness Adjustment (Fig. 4-8)

Adjust: RT1804 (CONTRAST) Electronic Viewfinder
RT1805 (BRIGHT) Electronic Viewfinder
Observe: Viewfinder

This procedure sets the normal viewing level of the picture.

1. Aim the camera at the gray scale chart.
2. Adjust BRIGHT (RT1805) and CONTRAST (RT1804) so that B/W tip graduations in the viewfinder screen match those on the monitor.

AUTO FOCUS ADJUSTMENT

1. Offset Adjustment (Figs. 4-7, 4-52)

Test Points: TL1 (A+B) Auto Focus
TL3 (A-B) Auto Focus
Adjust: RV04 (A+B OFFSET) Auto Focus
RV03 (A-B OFFSET) Auto Focus

1. Connect IC1-14 and GND.
2. Cover the infrared receiver with thick black paper to shut off the infrared rays.
3. Connect the oscilloscope channel-1 to TL1 (A+B).
4. Connect the oscilloscope channel-2 to TL3 (A-B).
5. Trigger the oscilloscope. (Use TL2 (SZ))
6. Turn the focus ring forcibly to its closeup (1.2m) end.
7. Adjust A+B OFFSET (RV04) so the waveform for channel-1 is minimum.
8. Adjust A-B OFFSET (RV03) so the waveform for channel-2 is minimum.
9. Disconnect short circuit IC1-14 and GND.

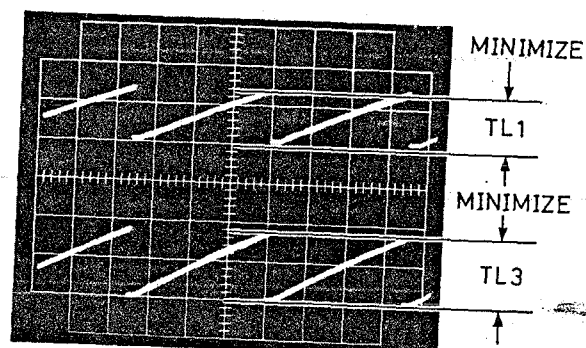


Fig. 4-52 Offset Adjustment

2. Gain Adjustment (Figs. 4-7, 4-53)

Test Point: TL1 (A+B) Auto Focus
Test: RV01 (Bch GAIN) Auto Focus
RV02 (Ach GAIN)

1. Connect IC1-14 and GND.
2. Aim the camera at a white object.
3. Move the object 50cm away from the infrared receiver.
4. Cover the receiver with a sheet of thin transparent paper (tracking paper, etc.).
5. Connect the oscilloscope to TL1 (A+B).
6. Turn the focus ring forcibly to its infinite (∞) end.
7. Adjust Ach GAIN (RV02) first and then adjust Bch GAIN (RV01) to shorten the trailing edge period of the waveforms.
8. Disconnect short circuit IC1-14 and GND.

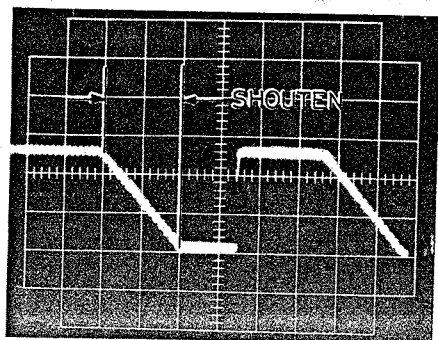


Fig. 4-53 Gain Adjustment

3. Offset Confirmation (Figs. 4-7, 4-52)

Test Points: TL1 (A+B)
TL3 (A-B)

Auto Focus
Auto Focus

1. Connect IC1-14 and GND.
2. Cover the infrared receiver with thick black paper to shut off the infrared rays.
3. Connect the oscilloscope channel-1 to TL-1 (A+B).
4. Connect the oscilloscope channel-2 to TL3 (A-B).
5. Confirm that the waveform is 0Vp-p $\pm$ 50mV.
6. If it is not within the range, readjust offset.
7. Disconnect short circuit IC1-14 and GND.

4. Sensor Position Adjustment (Fig. 4-54)

Adjust: Sensor Adjustment Screw

Observe: Monitor

1. Aim the camera at the resolution chart. (Set the power switch of light box to OFF position.)
2. Move the object 3m away from the camera lens.
3. Adjust the Sensor Adjustment Screw for optimum focus of the monitored picture.

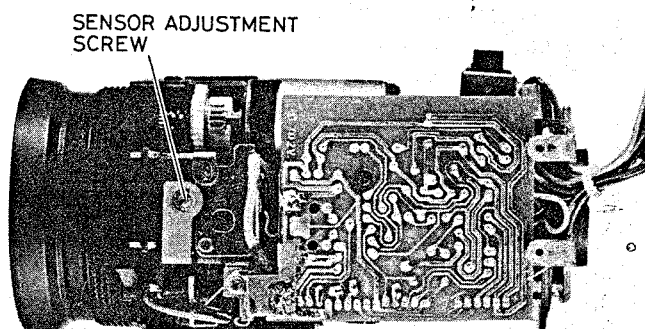


Fig. 4-54 Sensor Horizontal Position Adjustment

ADJUSTMENT PROCEDURE

Adjustment After Replacing Saticon

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. Target Voltage Adjustment
5. AGC Maximum Gain Preset Adjustment
6. Beam Current Adjustment
7. Streaking Adjustment
8. Dark Shading Adjustment
9. Dark Offset Adjustment
10. AGC Maximum Gain Adjustment
11. AIC Level Adjustment
12. Backfocus Adjustment
13. Chroma Carrier Level Adjustment
14. Vertical Size Adjustment
15. Horizontal Size and Horizontal Linearity Adjustment
16. Horizontal Centre and Vertical Centre Adjustment
17. Chroma Setup Preset Adjustment
18. R and B Signal Gain and Separation Preset Adjustment
19. Focus Preset Adjustment
20. Dynamic Focus Adjustment
21. Focus Adjustment
22. R and B Signal Shading Adjustment
23. R and B Signal Separation Adjustment
24. Dark Shading Confirmation
25. Dark Offset Confirmation
26. Chroma Setup Adjustment
27. R and B Signal Gain Adjustment
28. R and B Signal Tracking Adjustment
29. Burst Level Adjustment
30. Chroma Gain and Flicker Cancel Adjustment
31. Red Phase Adjustment
32. Low Light Chroma Gain Adjustment
33. White Balance Confirmation

Adjustment After Replacing Process Board

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. AGC Maximum Gain Preset Adjustment
5. Dark Shading Adjustment
6. Dark Offset Adjustment
7. AGC Maximum Gain Adjustment
8. AIC Level Adjustment
9. Chroma Carrier Level Adjustment
10. Chroma Setup Preset Adjustment
11. R and B Signal Gain and Separation Preset Adjustment
12. Focus Preset Adjustment
13. Dynamic Focus Adjustment
14. Focus Adjustment
15. R and B Signal Shading Adjustment
16. R and B Signal Separation Adjustment
17. Dark Shading Confirmation
18. Dark Offset Confirmation
19. Chroma Setup Adjustment
20. R and B Signal Gain Adjustment
21. R and B-Signal Tracking Adjustment
22. Burst Level Adjustment
23. Chroma Gain and Flicker Cancel Adjustment
24. Red Phase Adjustment
25. Low Light Chroma Gain Adjustment
26. White Balance Confirmation

Adjustment After Replacing Deflection Board and Regulator Board

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. Target Voltage Adjustment
5. Beam Current Adjustment
6. Dark Shading Adjustment
7. Dark Offset Adjustment
8. AIC Level Adjustment
9. Backfocus Adjustment
10. Chroma Carrier Level Adjustment
11. Vertical Size Adjustment
12. Horizontal Size and Horizontal Linearity Adjustment
13. Horizontal Centre and Vertical Centre Adjustment
14. Chroma Setup Preset Adjustment
15. R and B Signal Gain and Separation Preset Adjustment
16. Focus Preset Adjustment
17. Dynamic Focus Adjustment
18. Focus Adjustment
19. R and B Signal Shading Adjustment
20. R and B Signal Separation Adjustment
21. Dark Shading Confirmation
22. Dark Offset Confirmation
23. Chroma Setup Adjustment
24. R and B Signal Gain Adjustment
25. R and B Signal Tracking Adjustment
26. Burst Level Adjustment
27. Chroma Gain and Flicker Cancel Adjustment
28. Red Phase Adjustment
29. Low Light Chroma Gain Adjustment
30. White Balance Confirmation

Faulty Shading Adjustment

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. Focus Preset Adjustment
5. Dynamic Focus Adjustment
6. Focus Adjustment
7. R and B Signal Shading Adjustment
8. R and B Signal Separation Adjustment
9. Dark Shading Confirmation
10. Dark Offset Confirmation
11. Chroma Setup Adjustment
12. R and B Signal Gain Adjustment
13. R and B Signal Tracking Adjustment
14. Burst Level Adjustment
15. Chroma Gain and Flicker Cancel Adjustment
16. Red Phase Adjustment
17. Low Light Chroma Gain Adjustment

COMPONENT BOARDS LOCATION AND IDENTIFICATION

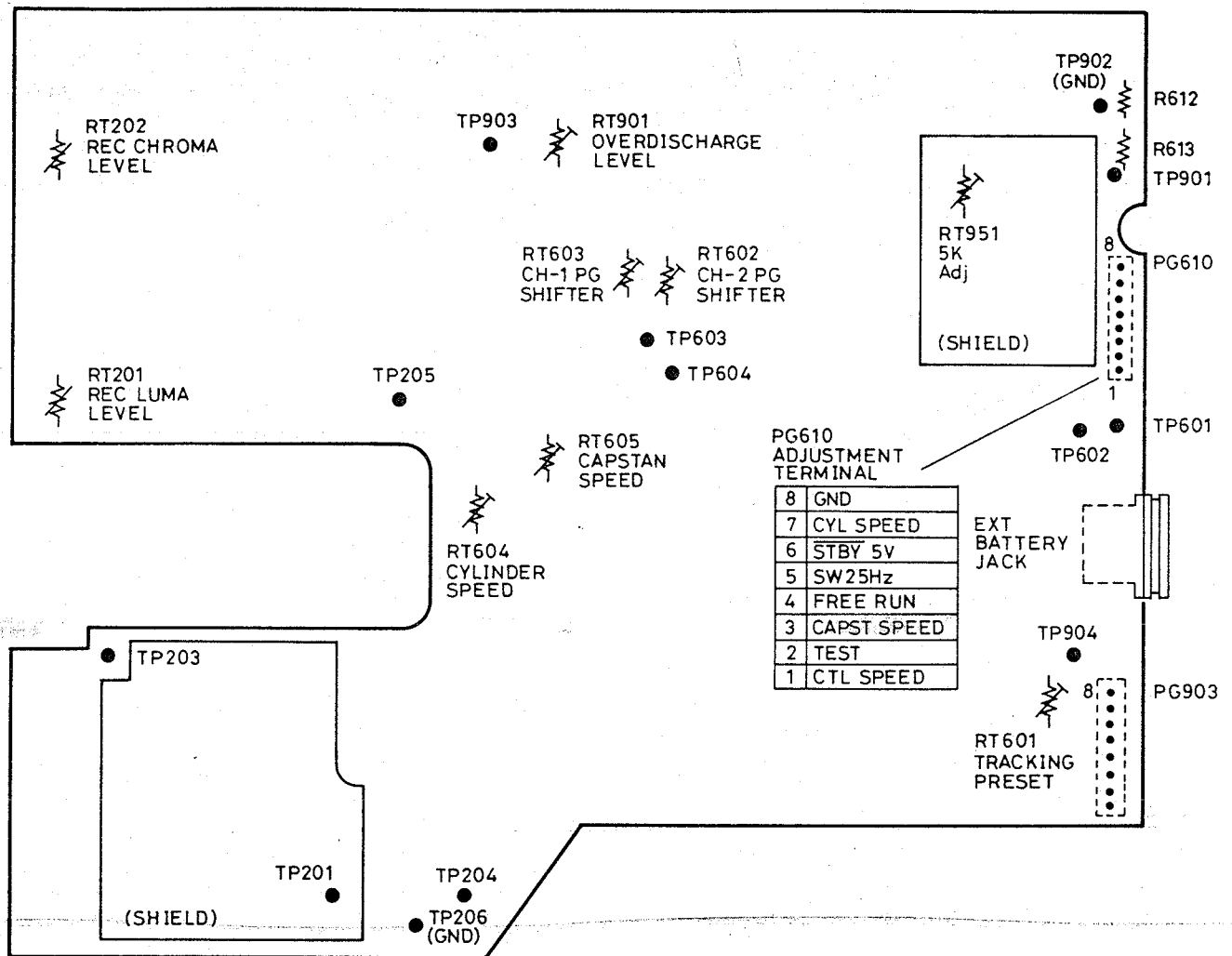


Fig. 4-101 Main Circuit Board (Solder Side)

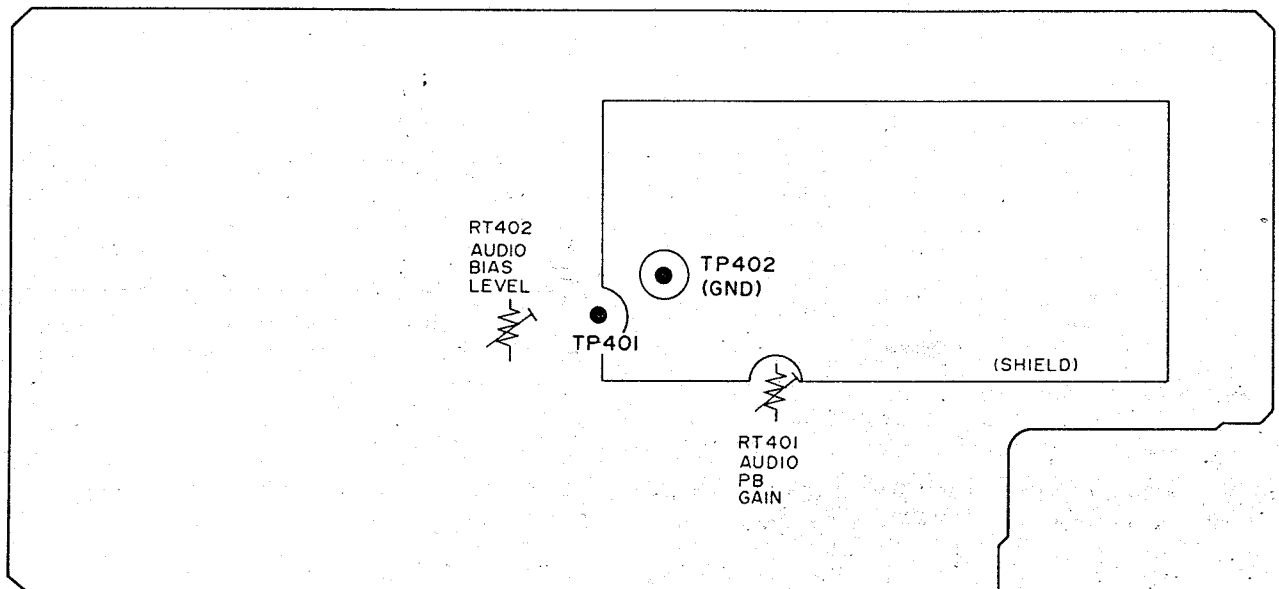


Fig. 4-102 Audio Circuit Board (Solder Side)

VTR SECTION

MAIN CIRCUIT (SWITCHING REGULATOR SECTION)

5V Adjustment (Fig. 4-101)

This adjustment sets the output voltage of the 5V Regulator precisely to 5V as the main power supply for the circuit.

Test Point: TP901 (5V) Main
Adjust: RT951 (5V Adj) Main

1. Apply the DC12V to the EXT battery jack.
2. Place the instrument in the "Record" mode.
3. Connect the DVM to TP901.
4. Adjust the 5V Adj control (RT951) for $5.3V \pm 0.05V$ DC.

Overdischarge Level Adjustment (Fig. 4-101)

This adjustment determines the overdischarge detection level. When the battery voltage drops to a specified level, the VTR will automatically shut off.

When the overdischarge detection level is set below 11.5V the battery service life will deteriorate. Conversely, when the voltage is adjusted higher than 11.6V the usable time per charge is shortened.

Observe: BATTERY display Left Side
Adjust: RT901 (OVERDISCHARGE LEVEL) Main

1. Turn the OVERDISCHARGE LEVEL control (RT901) fully counterclockwise.
2. Apply the DC11.6V $\pm 10mV$ to the EXT battery jack terminal.
3. Place the instrument in the "Record" mode.
4. Turn the OVERDISCHARGE LEVEL control (RT901) clockwise until center and right (F) displays go off.

MAIN CIRCUIT (SERVO SECTION)

Reference Frequency Adjustment (Fig. 4-101)

This reference frequency is used to correct for fluctuations caused by unevenness between the belt, pulley, capstan motor and capstan shaft.

Test Point: AUDIO OUTPUT (PG903-6) Main
Adjust: RT613 Main
RT614

1. Connect the frequency counter to AUDIO OUTPUT (PG903-6).
2. Connect a jumper between TP602 and TP901 on the main circuit board.
3. Load the instrument with an alignment tape and play-back the 3kHz audio signal.
4. Confirm that the frequency reading on the counter is $3000Hz \pm 15Hz$.
5. If the reading is higher than 3015Hz, remove R613. Check for the presence of R612. If not present, add R612.
6. If the reading is lower than 2985Hz, remove R612. Check for the presence of R613. If not present, add R613.
7. Remove the jumper.

Cylinder Motor Speed Adjustment

(Figs. 4-101, 4-103, 4-104)

This adjustment locks the cylinder servo to the system signal and maintains a constant cylinder speed of 2700 rpm. When not adjusted properly, horizontal stability is degraded and/or picture noise increases.

Test Point: TP603 (CYLINDER SPEED) Main
Adjust: RT604 (CYLINDER SPEED) Main

1. Connect the oscilloscope to TP603. (0.5V/5msec.cm)
2. Load the instrument with a blank tape and place the instrument in the "Record" mode.
3. Connect the jumper between TP601 and TP901 to release the cylinder phase control.
4. Adjust the CYLINDER MOTOR SPEED control (RT604) so that the sampling pulse stands still or moves slowly on the cylinder tach pulse. (See Fig. 4-103)
5. Remove the jumper between TP601 and TP901 and confirm the sampling pulse is locked in on the trailing edge of the cylinder tach pulse. (See Fig. 4-104)

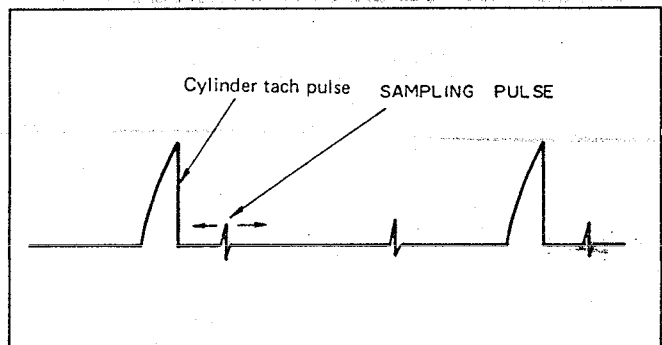


Fig. 4-103 Cylinder Motor Speed (During short circuiting)

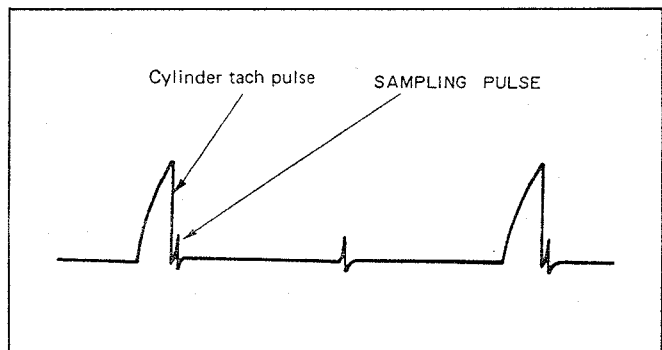


Fig. 4-104 Cylinder Motor Speed
(With short-circuiting disconnected)

Capstan Motor Speed Adjustment

(Figs. 4-101, 4-105, 4-106)

This adjustment locks the capstan servo to the system signals and maintains a constant tape transport speed. When not adjusted properly, the vertical stability is degraded and/or the picture noise increases.

Test Point: TP604 (CAPSTAN MOTOR SPEED) Main

Adjust: RT605 (CAPSTAN MOTOR SPEED) Main

1. Apply a colour bar signal to EVF jack.
2. Connect the oscilloscope to TP604. (0.5V/5msec.cm)
3. Load the instrument with a blank tape and place the instrument in the "Record" mode.
4. Connect a jumper between TP601 and TP901 to release the capstan phase control.
5. Adjust the CAPSTAN MOTOR SPEED control (RT605) so that the sampling pulse stands still or moves slowly on the cylinder tach pulse. (See Fig. 4-105)
6. Remove the jumper between TP601 and TP901 and confirm the sampling pulse is locked in on the trailing edge of the cylinder tach pulse. (See Fig. 4-106)

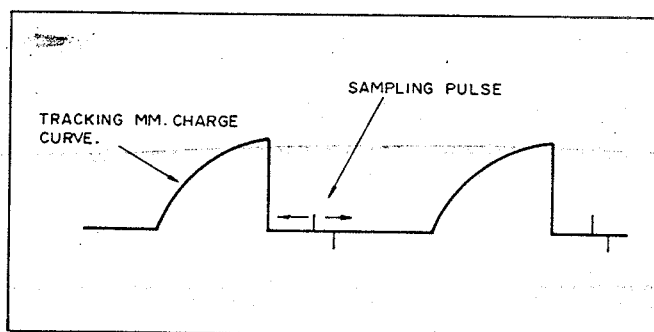


Fig. 4-105 Capstan Motor Speed (During short circuiting)

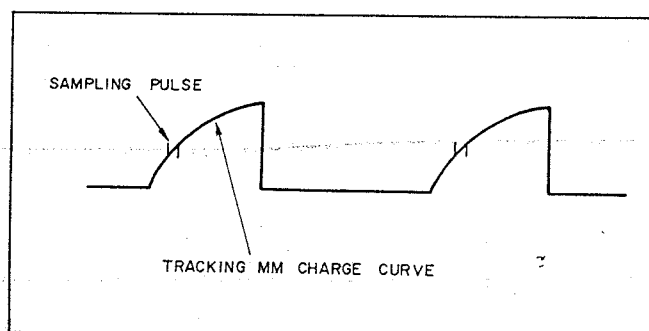


Fig. 4-106 Capstan Motor Speed
(With short-circuiting disconnected)

Head Switching Point Adjustment (Figs. 4-101, 4-107)

The pulse generator shifter determines the video head switching point during playback.

Misadjustment of PG Shifter may cause head switching noise in the picture and/or vertical.

Test Point: VIDEO OUT (TP904)

Main

Adjust: RT603 (CH-1 PG SHIFTER)

Main

RT602 (CH-2 PG SHIFTER)

Main

1. Load the instrument with an alignment tape and playback the colour bar signal.
2. Connect the oscilloscope to TP904. (2V/50μsec.cm)
3. Trigger the oscilloscope at SW 25Hz. (Use TP205 on the main circuit board.)
4. Set the oscilloscope to (-) slope and adjust the CH-1 PG SHIFTER (RT603) so that the leading edge of the SW 25Hz signal is placed 6.5H (horizontal) lines before the start of vertical sync.
5. Set the oscilloscope to (+) slope and adjust the CH-2 PG SHIFTER (RT602) so that the leading edge of the SW 25Hz signal is placed 6.5H (horizontal) lines before the start of vertical sync.

Note: The waveform of CH-1 and CH-2 video signals in the diagram may be opposite depending on the alignment tape.

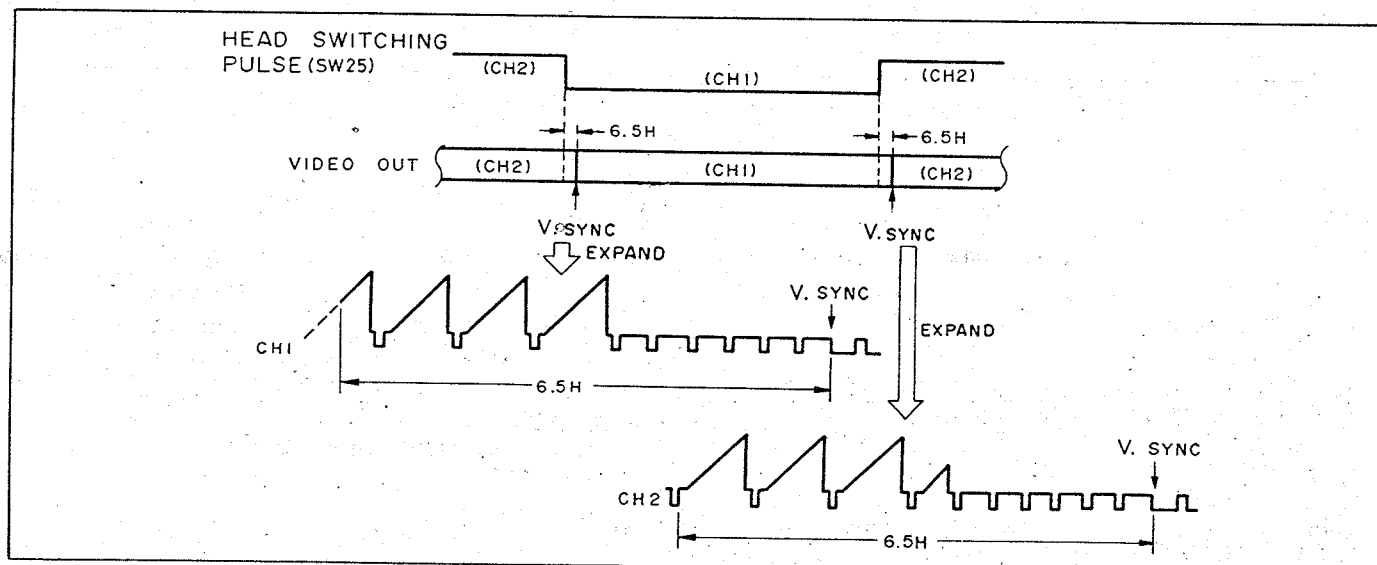


Fig. 4-107 Head Switching Point

MAIN CIRCUIT (LUMA/CHROMA SECTION)

Tracking Preset Adjustment (Figs. 4-101, 4-108)

This adjustment is performed to obtain tracking during playback of a tape recorded on the same instrument. When this adjustment is incomplete, noise may be conspicuous with the tracking control placed in the detent position or noise may not be removed by the tracking control.

Test Points: VIDEO OUT (TP904) Main
 TP604 (CAPSTAN SERVO) Main
 Adjust: RT601 (TRACKING PRESET) Main

1. Set the TRACKING control located on the left side to the mechanical centre (centre click) position.
2. Apply a colour bar signal to the EVF jack.
3. Using a blank tape, make a recording and playback.
4. Connect the Channel-1 of oscilloscope to TP904. (1V/0.5msec.cm)
5. Connect the channel-2 of oscilloscope to TP604. (0.5V/0.5msec.cm)
6. Trigger the oscilloscope at SW 25Hz. (Use TP205 on the main circuit board.)
7. Set the oscilloscope to (—) slope.
8. Adjust the TRACKING PRESET control (RT601) so that the CTL pulse and the vertical sync back porch of the video signal match.

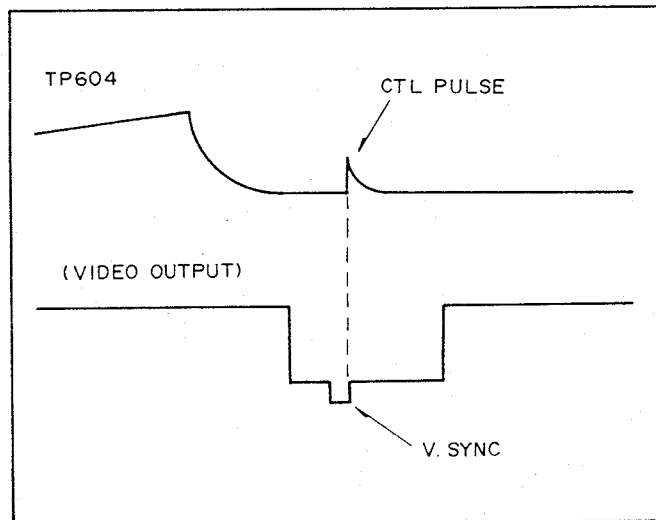


Fig. 4-108 Tracking Preset

Record Chroma Level Adjustment (Figs. 4-101, 4-109, 4-110, 4-111)

Optimum record colour level is regulated by this adjustment. If the record chroma level is too high, diamond beats can be seen in the screen. If the level is too low, the colour degraded.

Test Point: TP201 (REC CURRENT) Main
 Adjust: RT202 (REC CHROMA LEVEL) Main

1. Apply a colour bar signal to EVF jack.
2. Adjust the input colour bar signal level for 1Vp-p measured at the video input jack.
3. Connect the oscilloscope to TP201. (10mV/20μsec.cm)
4. Trigger the oscilloscope at 12.5 Hz. (Use TP204 on Main circuit board.)
5. Load the instrument with a blank tape and place in the "Record" mode.
6. Turn the REC LUMA LEVEL control (RT201) fully counterclockwise. (As seen from solder side.)
7. Check the upper cylinder for number stamped on the top. (See Fig. 4-109)
8. Adjust REC CHROMA LEVEL control (RT202) as shown in the chart. (See Figs. 4-110, 4-111)
9. Perform the record luma level adjustment.

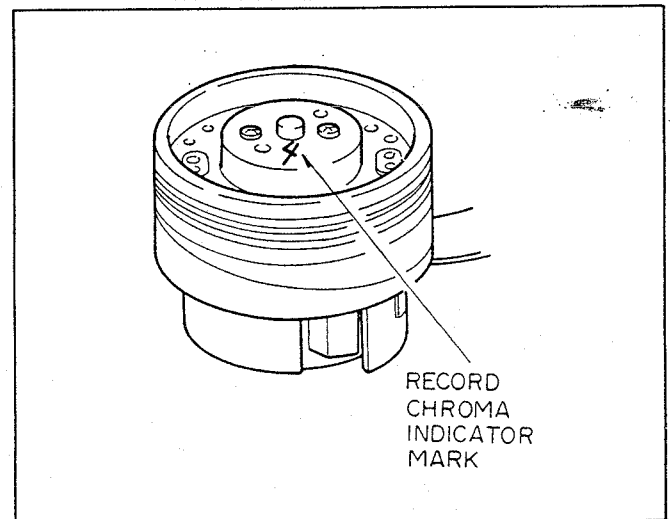
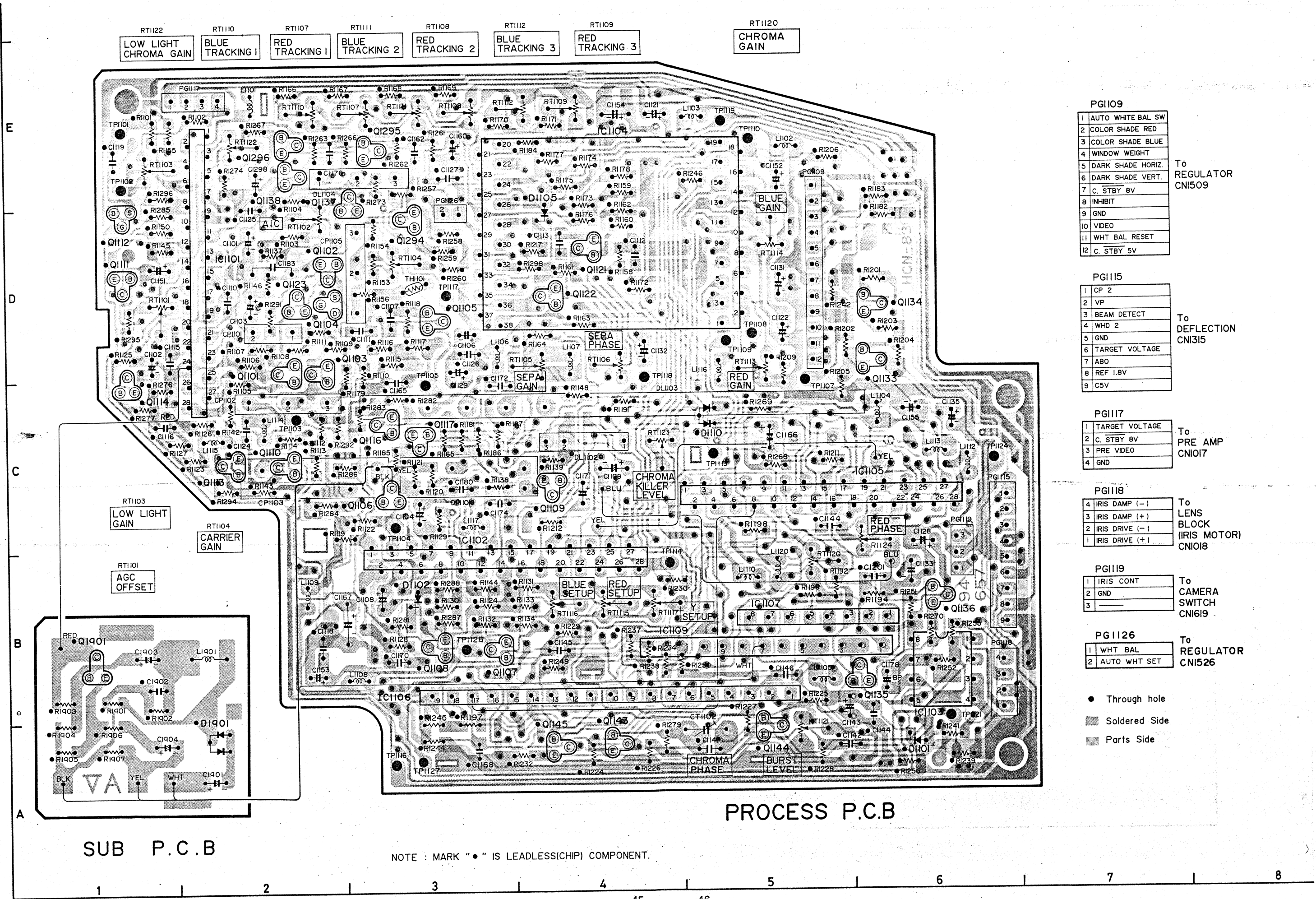
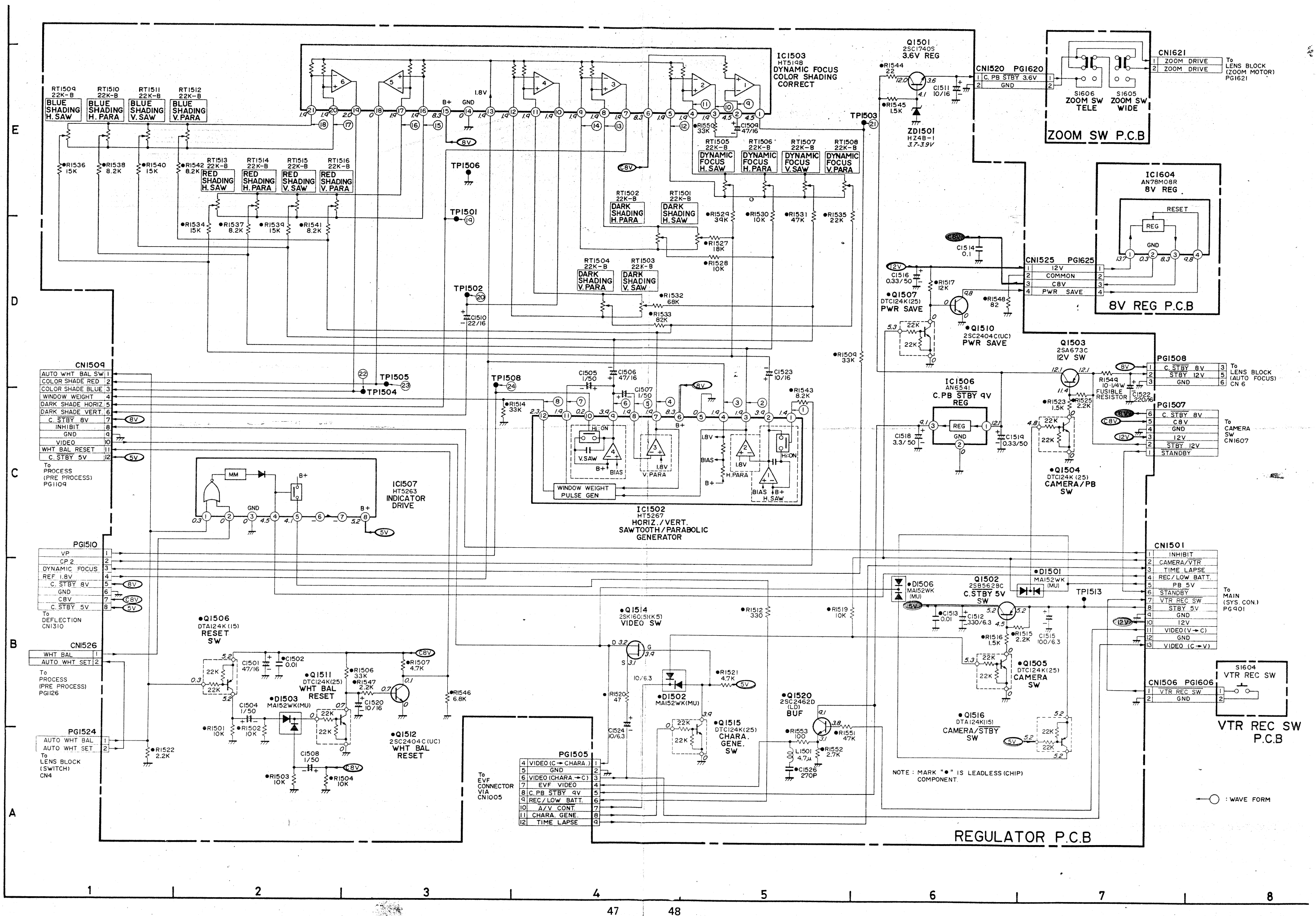


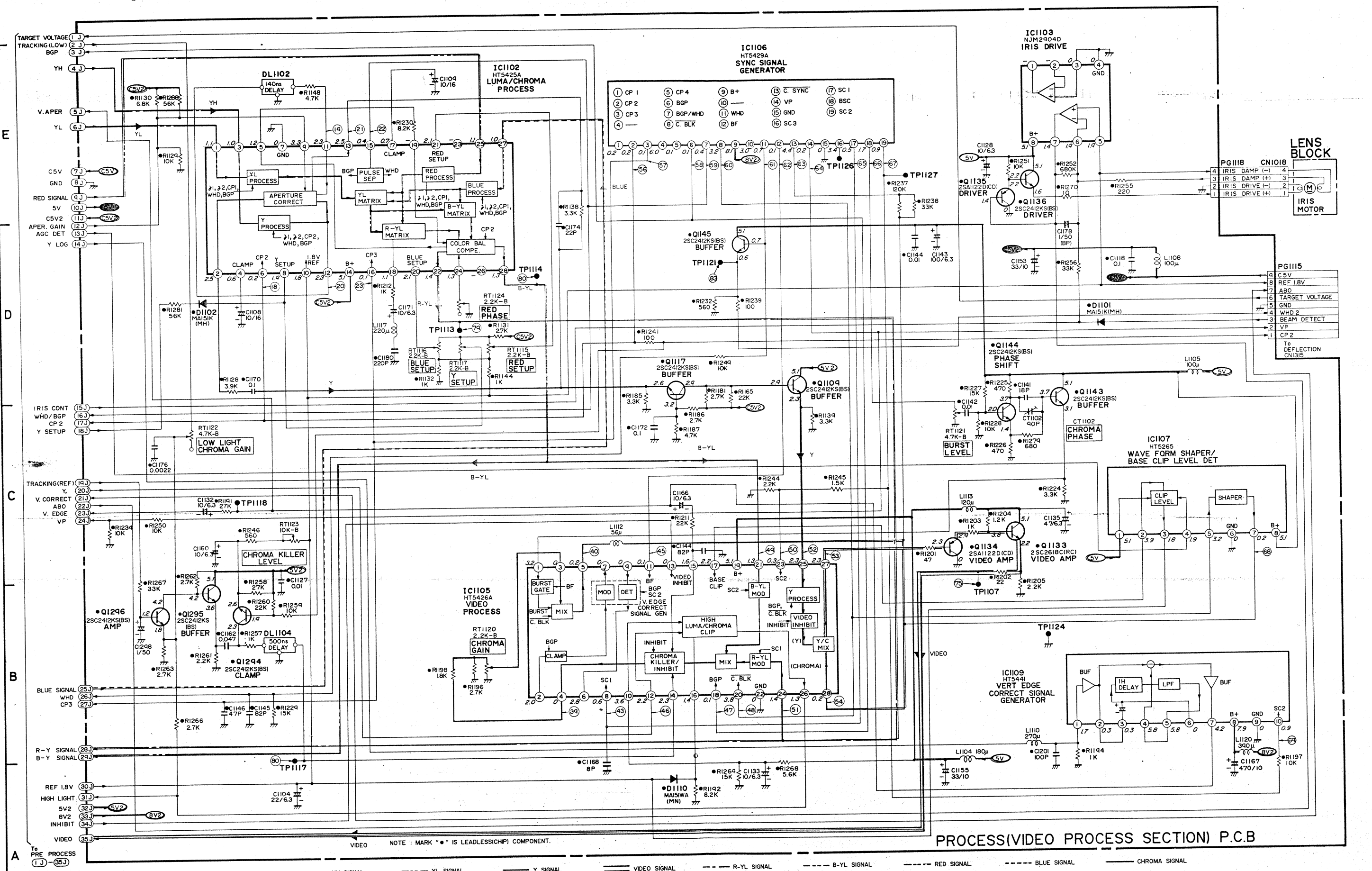
Fig. 4-109 Upper Cylinder Mark Location

MARK	LEVEL
0	30mVp-p
2	35mVp-p
4	40mVp-p

Fig. 4-110 Record Chroma Level







— MEMO —

PROCESS CIRCUIT BOARD

IC1101			
1	—	15	3.3
2	1.9	16	2.1
3	1.2	17	—
4	1.4	18	2.3
5	1.8	19	1.8
6	0	20	2.2
7	2.0	21	2.8
8	1.9	22	0
9	1.9	23	1.3
10	—	24	5.1
11	8.1	25	—
12	0.4	26	2.1
13	0.1	27	2.2
14	1.9	28	2.0

IC1102			
1	1.1	15	0.4
2	2.5	16	0.1
3	1.0	17	0.7
4	0.6	18	1.1
5	1.2	19	—
6	0.2	20	2.1
7	0	21	2.1
8	1.9	22	1.4
9	3.3	23	—
10	1.8	24	1.3
11	2.3	25	1.1
12	2.3	26	1.3
13	2.5	27	1.0
14	5.1	28	1.3

IC1103	
1	—
2	—
3	0
4	0
5	1.9
6	1.9
7	1.4
8	5.1

IC1104			
1	1.1	20	0
2	2.3	21	0.1
3	1.9	22	1.9
4	2.8	23	1.9
5	1.3	24	1.9
6	1.1	25	1.9
7	—	26	1.9
8	—	27	5.1
9	0	28	1.3
10	0	29	—
11	1.4	30	2.2
12	1.8	31	2.0
13	0.3	32	1.8
14	0.4	33	1.9
15	0.1	34	1.9
16	2.9	35	5.0
17	0.4	36	1.9
18	1.0	37	3.1
19	1.9	38	—

IC1105			
1	3.2	15	1.6
2	2.0	16	1.4
3	0	17	2.2
4	0	18	0.1
5	0.2	19	5.1
6	2.8	20	3.8
7	0	21	1.3
8	0.6	22	0
9	0	23	0.3
10	3.6	24	1.4
11	0.1	25	2.3
12	2.2	26	1.3
13	0	27	2.3
14	2.3	28	0.2

IC1106	
1	0.2
2	0.2
3	0.1
4	6.0
5	0.1
6	0.1
7	0.4
8	3.2
9	8.1
10	3.0
11	0.7
12	0.1
13	4.4
14	0.2
15	0
16	3.4
17	0.5
18	1.7
19	0.9

Q1108	
B	2.7
C	3.3
E	3.3

Q1117	
B	3.2
C	2.9
E	2.6

Q1136	
B	2.2
C	5.1
E	1.6

Q1101	
B	2.2
C	4.5
E	1.6

Q1105	
B	0.5
C	0
E	1.1

Q1106	
B	0.4
C	0
E	1.0

Q1107	
B	3.3
C	0
E	3.3

Q1109	
B	2.9
C	5.1
E	2.3

IC1107	
1	5.1
2	3.9
3	1.8
4	1.9
5	3.2
6	0
7	0.2
8	5.1

IC1109	
1	1.7
2	0.3
3	0.3
4	5.8
5	5.8
6	0
7	4.2
8	7.9
9	0
10	0.9

Q1113	
B	2.0
C	5.1
E	1.3

Q1114	
B	1.4
C	0
E	2.1

Q1116	
B	1.1
C	2.9
E	0.5

Q1121	
B	1.9
C	4.9
E	1.2

Q1110	
B	2.0
C	0
E	2.7

Q1111	
B	1.2
C	0
E	1.8

Q1112	
G	0.2
D	1.9
S	2.1

Q1134	
B	2.3
C	0
E	2.9

Q1135	
B	1.4
C	0
E	2.2

Q1137	
B	0.6
C	0
E	1.3

Q1138	
B	3.9
C	0
E	2.3

Q1122	
B	3.7
C	5.1
E	3.1

Q1123	
B	1.7
C	0
E	2.3

Q1133	
B	3.8
C	5.1
E	2.2

Q1294	
B	1.9
C	2.3
E	2.6

Q1295	
B	4.2
C	5.1
E	3.6

Q1296	
B	1.2
C	4.2
E	1.8

Q1102	
B	4.5
C	1.7
E	5.1

Q1143	
B	3.7
C	5.1
E	3.1

Q1144	
B	2.0
C	3.7
E	1.4

Q1145	
B	0.7
C	5.1
E	0.6

Q1103	
B	1.6
C	5.1
E	1.0

Q1104	
G	2.2
D	1.6
S	1.7

Q1901	
B	2.9
C	5.1
E	2.3

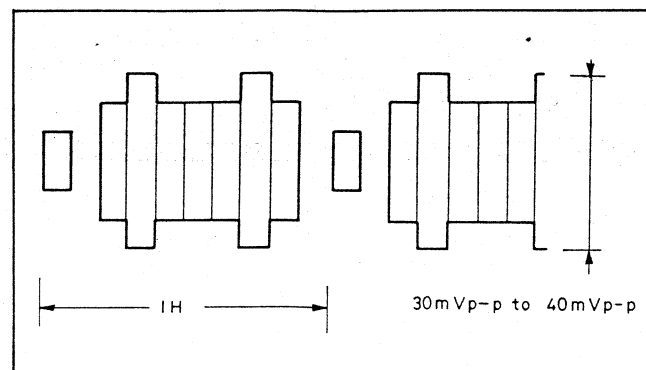


Fig. 4-111 Record Chroma Level

Record Luminance Level Adjustment (Figs. 4-101, 4-112)

Optimum record luma level is regulated by this adjustment. If the record luma level is too high, video may overload. If the level is too low, the S/N ratio deteriorate. Record chroma level should be set prior to adjusting the record luma level.

Test Point: TP201 (REC CURRENT) Main
Adjust: RT201 (REC LUMA LEVEL) Main

1. Apply a colour bar signal to EVF jack.
2. Adjust the input colour bar signal level for 1Vp-p measured at the video input jack.
3. Connect the oscilloscope to TP201. (50mV/20μsec/cm)
4. Load the instrument with a blank tape and place in the "Record" mode.
5. Adjust REC LUMA LEVEL control (RT201) for 130mVp-p ± 10mV.

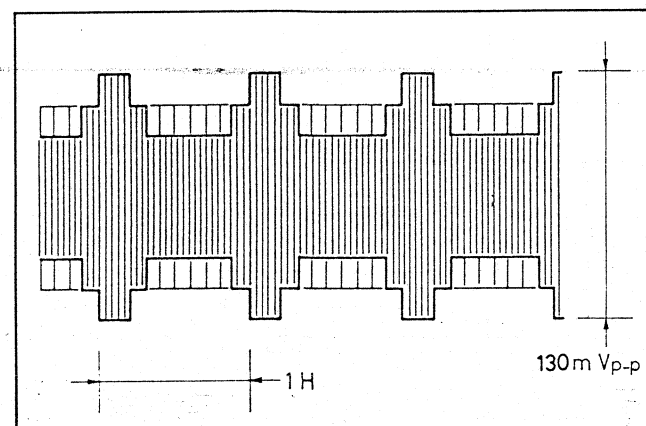


Fig. 4-112 Record Luminance Level

AUDIO CIRCUIT

Audio Playback Gain Adjustment

This adjustment sets the output level of the audio signal to the specified level.

Test Points: PG903-6 (AUDIO OUTPUT) Main
PG903-4 (AUDIO GND) Main
Adjust: RT401 (AUDIO PB GAIN) Audio

1. Connect the millivoltmeter to PG903-6. (Used GND PG903-4)
2. Load the instrument with an alignment tape and playback a 1kHz audio signal.
3. Adjust the AUDIO PB GAIN control (RT401) for 90mVrms.

Audio Bias Level Adjustment

This adjustment optimizes the audio record bias. When the audio record bias is too low, high frequencies are increased resulting in distortion. When the level is too high, high frequencies are attenuated.

Test Points: TP401 (REC BIAS) Audio
TP402 (BIAS GND) Audio
Adjust: RT402 (AUDIO BIAS LEVEL) Audio

1. Connect the millivoltmeter to TP401. (Used GND TP402)
2. Load the instrument with a blank tape and place in the "Record" mode.
3. Adjust AUDIO BIAS LEVEL control (RT402) for 2.6mV ± 0.1mVrms.

SCHEMATIC DIAGRAMS AND CIRCUIT BOARD DIAGRAMS

WHEN USING THIS SERVICE REFERENCE MATERIAL

1. How to read abbreviations

Note

1. Voltage measured at base of chassis with minimum volume control and no signal.
2. Nomenclature of Resistors and Capacitors

Circuit No	
Value	No indicated Ω (Ohm) M - 1000kΩ
Tolerance	No indicated ± 5% K ± 10% M ± 20%
Wattage	No indicated 1/4 W
Sort	No indicated Carbon film RC Composition RW Wire wound RS Oxide metal film RN Fixed metal film

Circuit No	
Value	No indicated μF P PF
Tolerance	No indicated ± 10% J ± 5% M ± 20% Z ± 80% 20% D ± 0.5pF C ± 0.25pF
Sort	⊕ ⊖ Ceramic ⊕ ⊖ Electrolytic ⊕ ⊖ Mylar ⊕ ⊖ Polyester ⊕ ⊖ Styrol
Voltage	No indicated 50WV

3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort

3. How to read capacity and inductance of resistor shape capacitors and coils

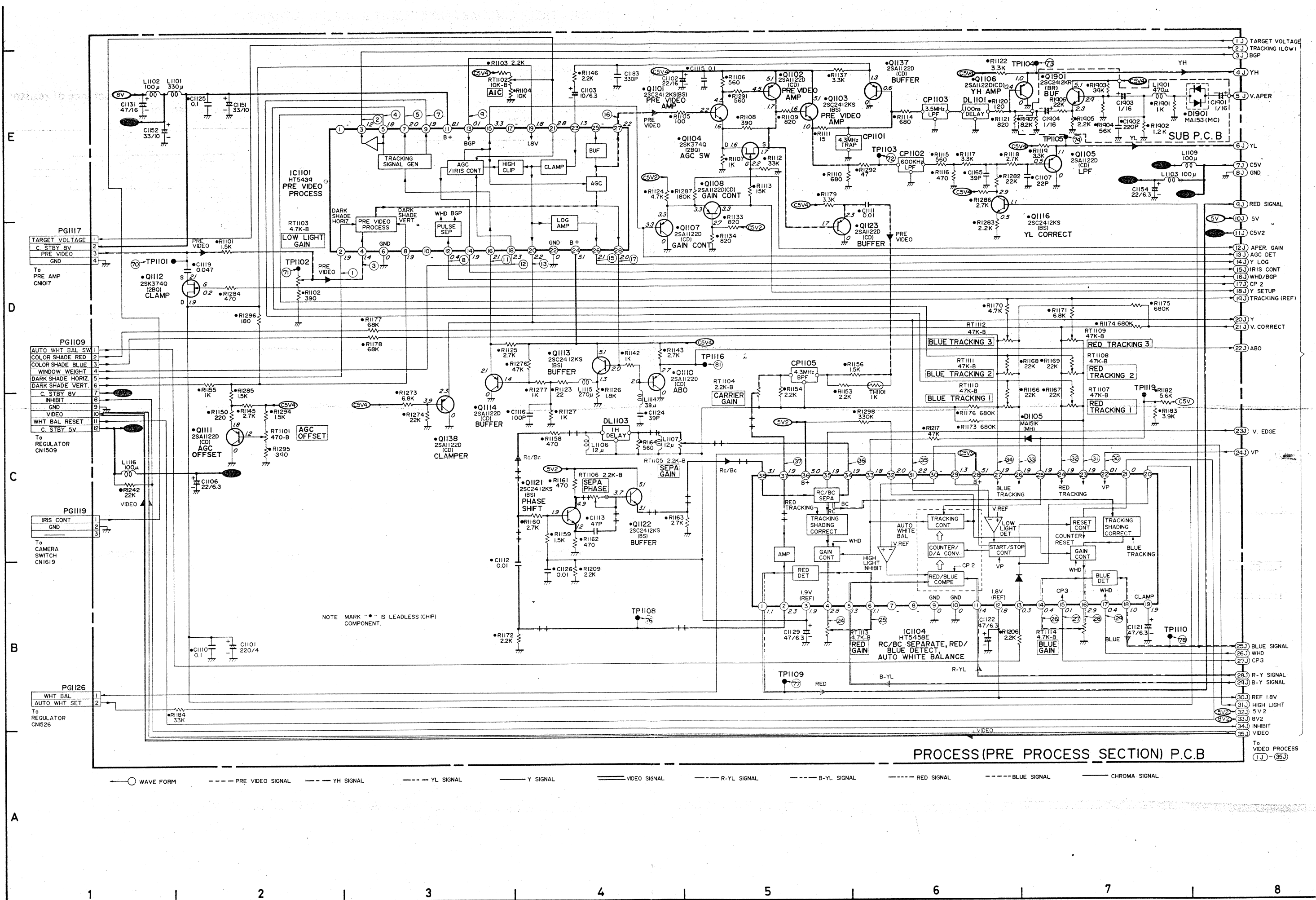
CAPACITOR	
A B C D E	
CAPACITY:	(10A+B) × C [PF]
TOLERANCE:	D
RATED VOLTAGE:	BODY COLOR Pink: 25V Green: 50V
CHARACTERISTICS:	E

COIL	
A B C	
INDUCTANCE:	(10A+B) × C [μH]

COLOR	A, B	C	D	E
Black	0	10 ⁰	±20%	For temperature compensation
Brown	1	10 ¹		
Red	2	10 ²		
Orange	3	10 ³		
Yellow	4	10 ⁴		
Green	5	10 ⁵		
Blue	6			
Violet	7			
Grey	8		±30%	High dielectric constant type
White	9			For temperature compensation
Gold		10 ⁻¹	± 5%	
Silver		10 ⁻²	± 10%	High dielectric constant type

2. Cautions on use of MOS IC

1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a workers should be grounded.
4. Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.



REGULATOR CIRCUIT BOARD

Q1501	
B	4.1
C	12.0
E	3.6

Q1502	
B	4.5
C	5.2
E	5.2

Q1503	
B	11.4
C	12.1
E	12.1

Q1504	
B	4.8
C	0
E	0

Q1505	
B	5.3
C	0
E	0

Q1506	
B	0.3
C	5.2
E	5.2

Q1507	
B	5.3
C	0
E	0

Q1510	
B	0
C	9.8
E	0

Q1511	
B	0
C	0.7
E	0

Q1512	
B	0.7
C	0.1
E	0

Q1514	
D	3.2
G	3.9
S	3.1

Q1515	
B	0
C	3.9
E	0

Q1516	
B	5.2
C	5.2
E	5.2

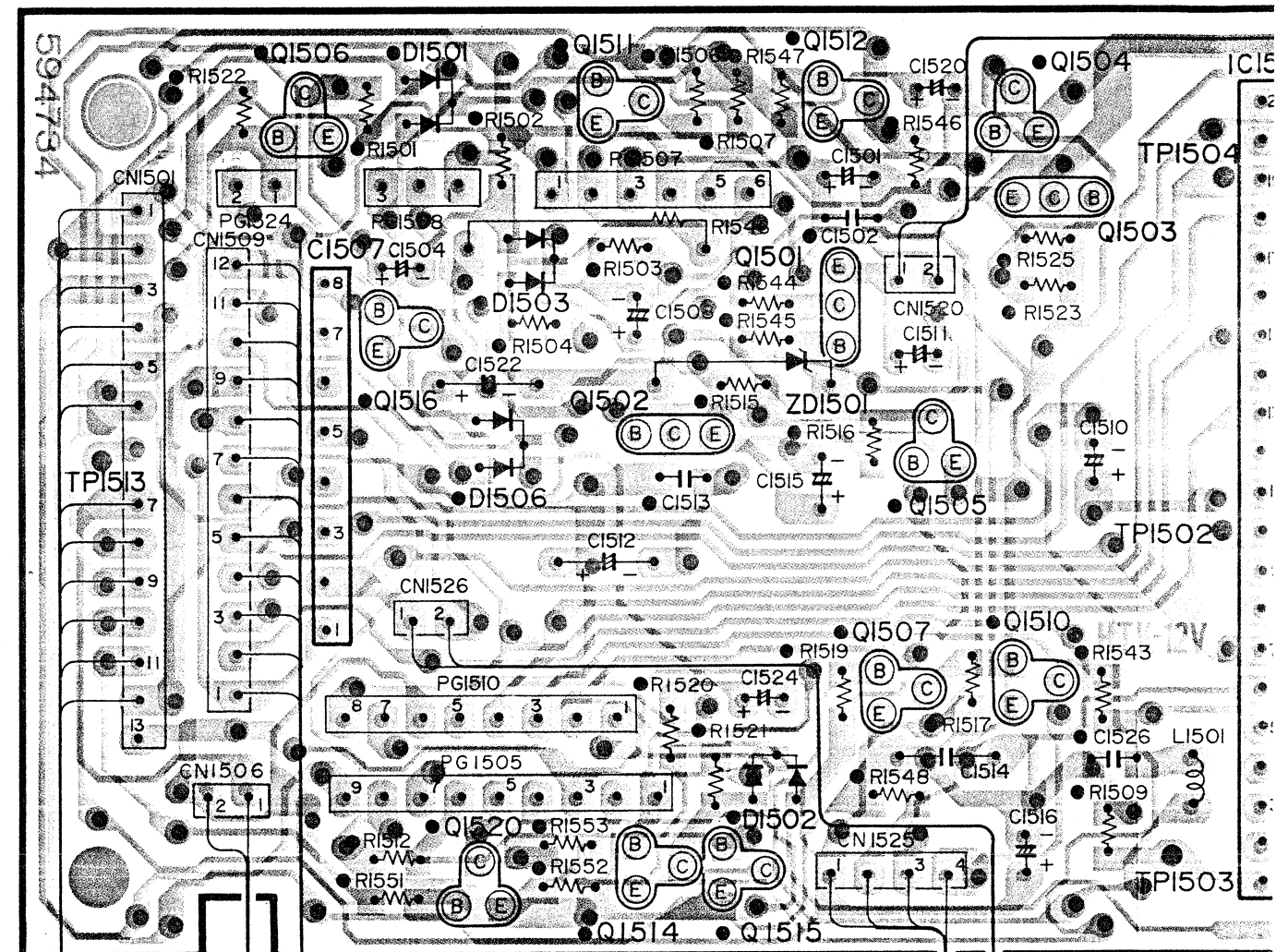
Q1520	
B	3.8
C	9.1
E	3.1

IC1503	
21	1.9
20	1.9
19	2.0
18	0
17	1.9
16	1.9
15	8.3
14	0
13	1.9
12	1.9
11	1.9
10	1.9
9	1.9
8	1.9
7	1.9
6	8.3
5	1.9
4	1.9
3	1.9
2	4.5
1	4.5

IC1502	
12	2.3
11	1.9
10	0.2
9	3.9
8	1.9
7	1.9
6	8.3
5	0
4	1.9
3	1.9
2	3.9
1	1.4

IC1506		
1	2	3
12.1	0	9.1

IC1507	
1	0.3
2	0
3	0
4	4.5
5	4.1
6	—
7	—
8	5.2



NOTE : MARK "●" IS LEADLESS(CHIP) COMPONENT.
MARK "Z" IS LEADLESS JUMPER.

CN1501	
BRN	1 INHIBIT
RED	2 CAMERA/VTR
ORN	3 TIME LAPSE
YEL	4 REC/LOW BATT.
PNK	5 PB 5V
BLU	6 STANDBY
PUR	7 VTR REC SW
GRY	8 STBY 5V
WHT	9 GND
BLK	10 12V
BRN	11 VIDEO(V→C)
WHT	12 GND
	13 VIDEO(C→V)

To
MAIN
(SYS.CON.)
PG901

CN1509	
RED	12 C. STBY 5V
BRN	11 WHT BAL RESET
BLK	10 VIDEO
WHT	9 GND
GRY	8 INHIBIT
PUR	7 C. STBY 8V
BLU	6 DARK SHADE VERT.
PNK	5 DARK SHADE HORIZ.
YEL	4 WINDOW WEIGHT
ORN	3 COLOR SHADE BLUE
RED	2 COLOR SHADE RED
BRN	1 AUTO WHT BAL

To
PROCESS
(PRE PROCESS)
PG1109

CN1506	
1	VTR REC SW
2	GND

To
VTR REC SW
PG1606

PG1524	
1	AUTO WHT BAL
2	AUTO WHT SET

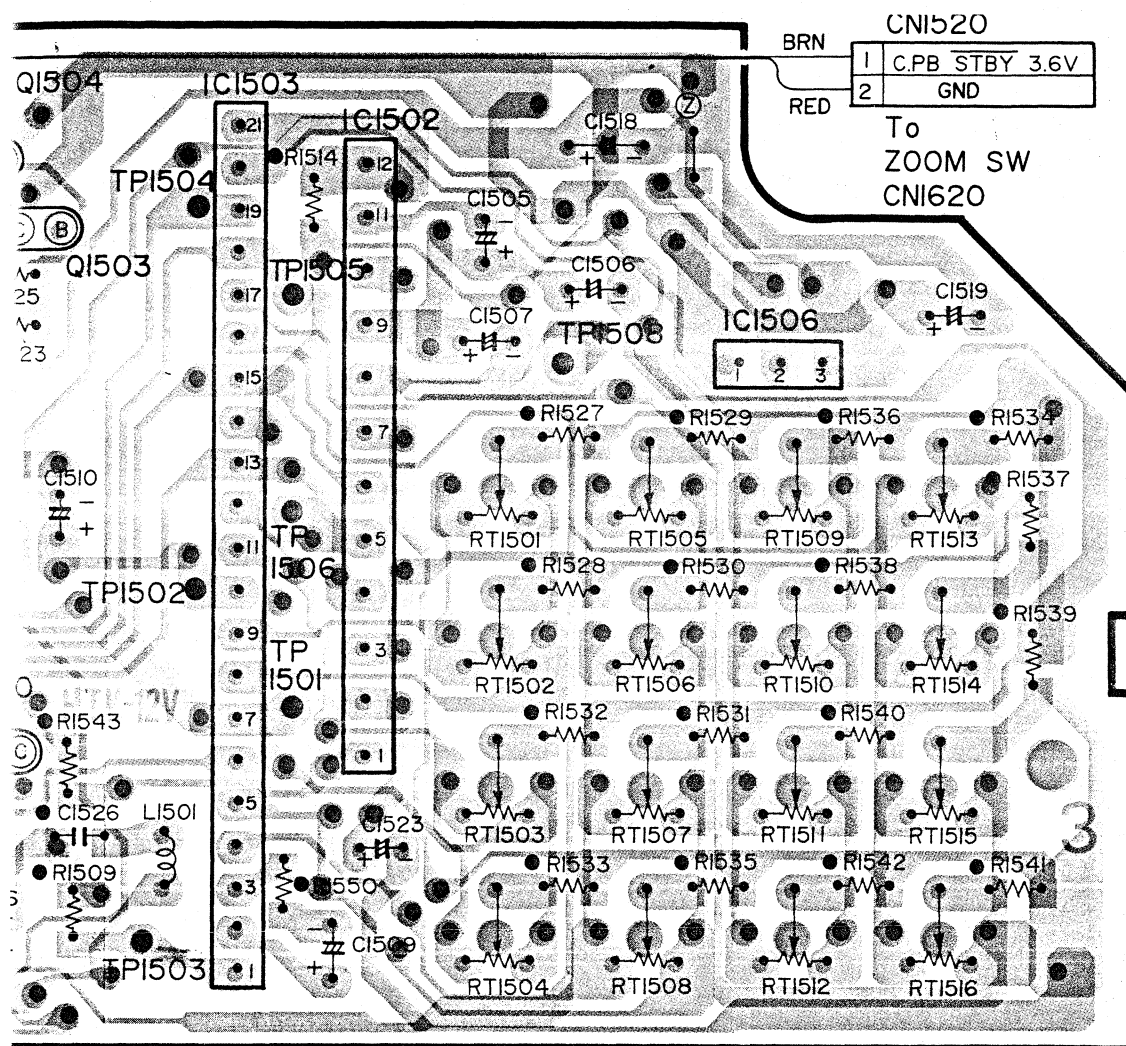
To
LENS BLOCK
(SWITCH)
CN4

CN1526	
1	WHT BAL
2	AUTO WHT SET

To
PROCESS
(PRE PROCESS)
PG1126

CN1525	
1	12V
2	COMMON
3	C8V
4	PWR SAVE

To
8V REG
PG1625



REGULATOR P.C.B

CN1526

1	WHT BAL
2	AUTO WHT SET

To
PROCESS
(PRE PROCESS)
PG1126

CN1525

1	12V
2	COMMON
3	C8V
4	PWR SAVE

To
8V REG
PG1625

RT1501

DARK
SHADING
H.SAW

RT1502

DARK
SHADING
H.PARA

RT1503

DARK
SHADING
V.SAW

RT1504

DARK
SHADING
V.PARA

RT1505

DYNAMIC
FOCUS
H.SAW

RT1506

DYNAMIC
FOCUS
H.PARA

RT1507

DYNAMIC
FOCUS
V.SAW

RT1508

DYNAMIC
FOCUS
V.PARA

RT1509

BLUE
SHADING
H.SAW

RT1510

BLUE
SHADING
H.PARA

RT1511

BLUE
SHADING
V.SAW

RT1512

BLUE
SHADING
V.PARA

RT1513

RED
SHADING
H.SAW

RT1514

RED
SHADING
H.PARA

RT1515

RED
SHADING
V.SAW

RT1516

RED
SHADING
V.PARA

■ Soldered Side

■ Parts Side

● Through hole

PG1505

1	VIDEO(C→CHARA)	4
2	GND	5
3	VIDEO(CHARA→C)	6
4	EVF VIDEO	7
5	C. PB STBY 9V	8
6	REC/LOW BATT.	9
7	A/V CONT.	10
8	CHARA. GEN.	11
9	TIME LAPSE	12

To
EVF
CONNECTOR
VIA CN1005

PG1507

6	C. STBY 8V
5	C8V
4	GND
3	12V
2	STBY 12V
1	STANDBY

To
CAMERA SW
CN1607

PG1508

1	C. STBY 8V	3
2	STBY 12V	5
3	GND	6

To
LENS BLOCK
(AUTO FOCUS)
CN6

PG1510

1	VP
2	CP 2
3	DYNAMIC FOCUS
4	REF 1.8V
5	C. STBY 8V
6	GND
7	C8V
8	C. STBY 5V

To
DEFLECTION
CN1310

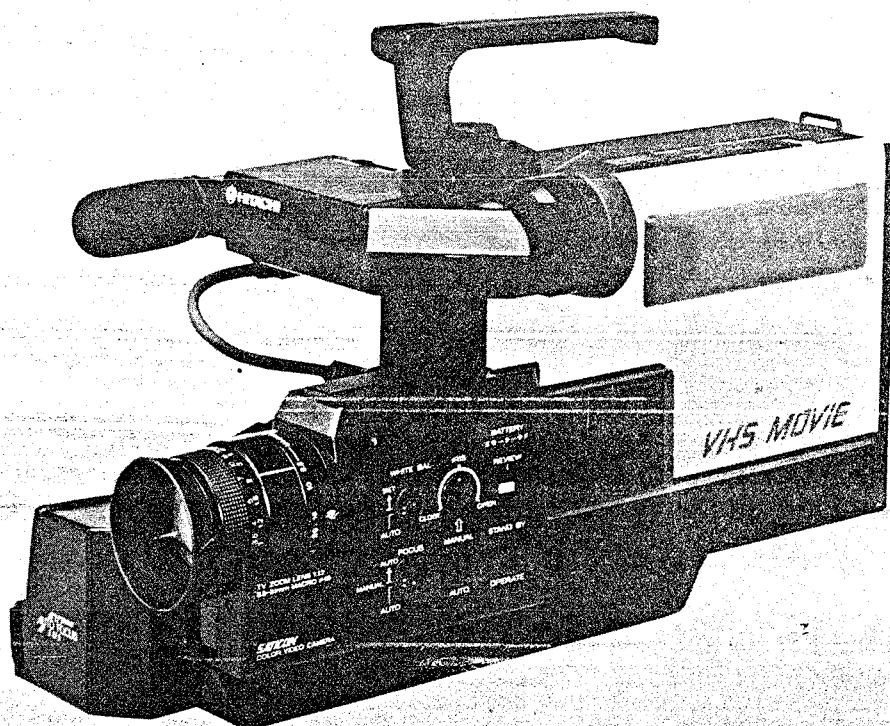


HITACHI

SERVICE MANUAL

TK**NO.2356E****VM-200E**

Technical Data

**VHS**

THIS VIDEO DECK IS A VHS TYPE VIDEO RECORDER. FOR PROPER OPERATION, ONLY THE VHS TYPE CASSETTE MUST BE USED.

SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers! Critical parts are marked with ⚠ in the schematic diagram, and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CAMERA/RECORDER

Oct. 1985**TOKAI WORKS**



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SPECIFICATIONS

■ General

Power requirements	12V DC
Power consumption	9.5 watts (When AUTO/MANUAL FOCUS Switch is "MANUAL".)
Dimensions	164(W) x 189(H) x 354(H) mm
Weight	2.5 kg

■ Video Recorder Section

Format	VHS
Record/playback system	Four video record/playback heads
Video signal	PAL colour & CCIR monochrome signals 625 lines
Tape speed	23.39 mm/sec.
Video input	1.0 Vp-p, 75 ohm (with Audio/Video Input Adaptor)
Video output	1.0 Vp-p, 75 ohm
Mic input	-68 dBs, more than 1K ohm
Audio input	-8 dBs, more than 50K ohms (with Audio/Video Adaptor)
Audio output	-8 dBs, less than 1K ohm
Earphone output	-26 dBs, (8 ohms terminal)
Fast forward/rewind time	Less than 8 minutes with E-180 cassette

■ Camera Section

Scanning	625 lines/50 fields/25 frames
Required minimum illumination	10 lux
Camera tube	1/2" striped Saticon
Lens diameter	46 mm

IDENTIFICATION AND OPERATION OF CONTROLS

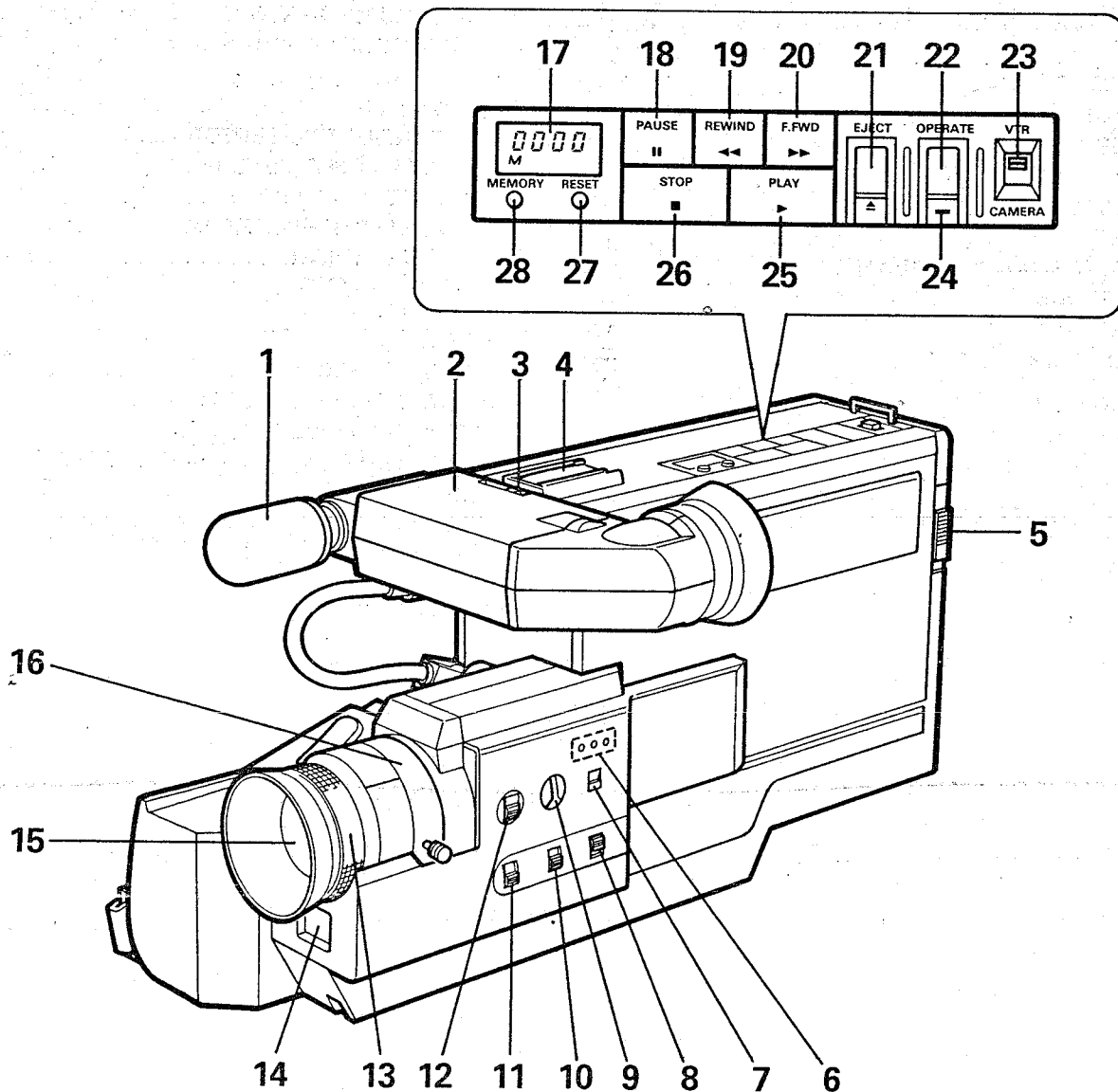


Fig. 1-1

1. Microphone

Sensitive to sounds coming from the direction in which the camera is pointed. Detachable with fastening ring.

2. Electronic Viewfinder (EVF)

Displays what the Camera/Recorder lens sees. The electronic viewfinder also functions as a convenient black-and-white monitor during playback of recorded material.

3. LOCK/RELEASE Lever

Slide the Lever to "RELEASE" position. Used to adjust the eyepiece position of Electronic Viewfinder (EVF).

4. Accessory Shoe

Used to attach the Carrying Handle (Optional accessory) or Camera Light.

5. BATT EJECT Lever

Releases the Battery or the AC Adaptor/Charger attached to the Camera/Recorder.

6. BATTERY Indicators

These three Lights give the user a general idea of the Battery conditions. A fully charged Battery causes all three Lights to light.

7. REVIEW Button

Used to review the last few seconds of the recorded segment in the record/pause mode.

8. STAND BY Switch

This is a Switch to minimize the Battery power consumption. In "STAND BY" position, the Electronic Viewfinder is disabled.

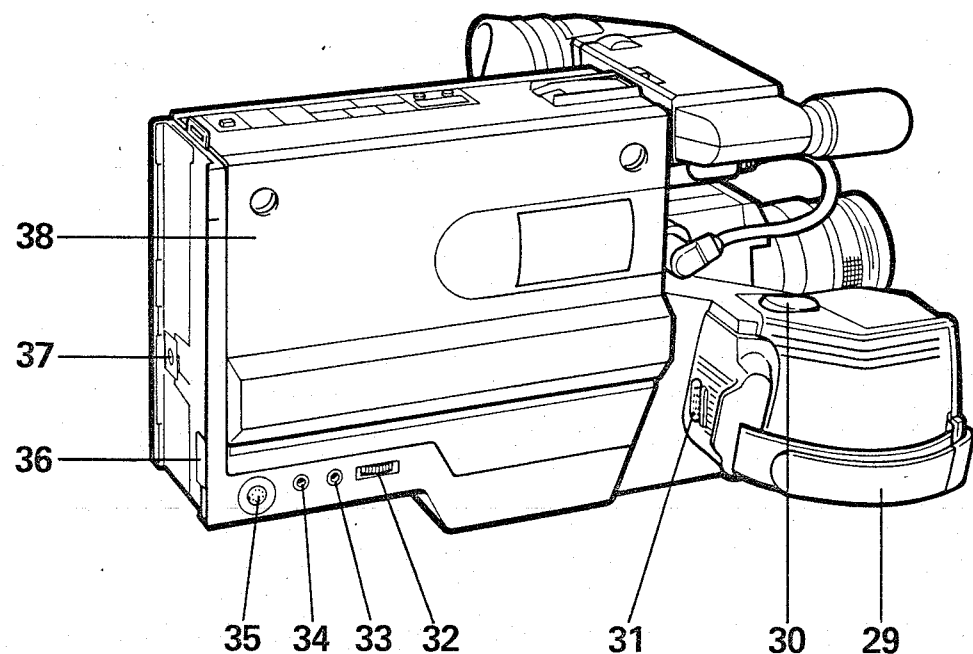


Fig. 1-2

9. Iris Control

Increase the light incident to lens in the back light by turning this knob.

10. IRIS AUTO/MANUAL select switch

Set this Switch to the "AUTO" position generally. The iris is controlled automatically.

Set the Switch to "MANUAL" to change the iris manually by turning the Iris Control.

11. AUTO/MANUAL FOCUS Switch

Set this Switch to the "AUTO" position for automatic focusing, and to the "MANUAL" position for focusing with the Focus Ring. When the Switch is held in the upper position, automatic focusing is performed until the Switch is released.

12. WHITE BALANCE Switch

When this Switch is in the "AUTO" position, the colour balance is set automatically. When this Switch is in the "SET" position, the colour balance is set manually.

13. Focus Ring

Do not attempt to manually turn the Focus Ring when the Camera/Recorder is in the AUTO FOCUS mode.

14. Auto Focus Window

To automatically focus the camera lens, this window receives infrared light which is transmitted from the Camera/Recorder lens and is reflected back from the object.

15. Lens

F1.2 (8.5 ~ 51 mm) 6:1 power zoom lens features with auto focus and auto iris functions.

16. Zoom Ring (Manual Zooming)

The picture size can be magnified 6 times with the use of the zoom feature. Just rotate the Zoom Ring for a close up (T) or wide angle (W) picture. Macro close-up, as close as 1 cm from object, is possible.

17. Tape Counter

Indicates tape position. Used to locate a particular point on the tape.

18. PAUSE Button

Press this Button during playback to display a still picture on the viewfinder.

19. REWIND Button

Press this Button during Stop, Pause or Fast forward mode, and fast-rewinding starts. Press the Button during playback of tape, and the tape is played back in the rewind direction approximately 3 times faster than the normal speed to confirm the recorded contents.

20. F.FWD Button

Press this Button during Stop, Pause or Rewind mode, and fast-forwarding starts. Press the Button during playback of tape, and the tape is played back in the forward direction approximately 3 times faster than the normal speed to confirm the recorded content.

21. EJECT Button

Press to insert or remove the cassette.

22. OPERATE Button

Press this Button to turn Camera/Recorder on. Press again to turn Camera/Recorder off. OPERATE Light illuminates when this Button is pressed and Camera/Recorder is on.

23. VTR/CAMERA Select Switch

This Switch changes the Camera/Recorder to the record mode or to the playback mode. The Switch must be in "CAMERA" position for recording.

24. OPERATE Light and Dew Indicator Light

Flashing of the Light on the OPERATE Button indicates dew condensation on Camera/Recorder mechanism. While this Light is flashing, the unit will not operate. Then leave the power on. When the Light stops flashing, the unit can be operated.

25. PLAY Button

Used for playback.

26. STOP Button

The STOP Button is used to stop playback, rewind, and fast forward operations. The STOP Button has no effect during record operation.

27. RESET Button

Press to reset the Tape Counter to "0000".

28. MEMORY Button

If this Button is pressed, "M" appears on the Tape Counter Display and it memorizes the tape position of "0000".

29. Hand Strap

Adjust to best fit to your hand.

30. Power Zoom Switch

This switch performs zooming electrically.

"W": Picture becomes wider gradually.

"T": Picture becomes telescopic gradually.

31. Record Start/Stop Switch

This Switch is used to control the Camera/Recorder. When this switch is pressed with the Camera/Recorder set to the recording mode, the tape runs to start recording.

When this Button is pressed again, the tape stops and the Camera/Recorder enters the record/pause (stand-by) mode.

32. TRACKING Control

Used when playing a tape recorded on another VTR. Adjust for best picture. At all other times leave it in the center position, which can be found as a small detent in the movement of the knob.

33. REC/PAUSE Jack

Recording and pausing may be remotely controlled by an optional Camera Remote Control Unit.

34. EARPHONE Jack

Sound being recorded by the microphone or played back may be monitored by optional earphone to this jack.

35. A/V OUT Jack

Connect the optional Audio/Video Output Cable to this jack and to the audio and video inputs of your TV/monitor receiver. You may also connect the optional RF Converter Unit to this jack and your TV receiver.

36. Power Terminal Protection Cover

This Cover should be in the uppermost position covering the terminal at all times.

37. DC IN-12V Jack

Used for the optional Car Battery Cord which connects to the cigarette lighter socket in your car.

38. Cassette Holder

Press EJECT Button to open the Cassette Holder. Be aware of the Cassette direction when inserting.

NOTE: Power source must be connected to open the Cassette Holder.

CIRCUIT BOARD LOCATION

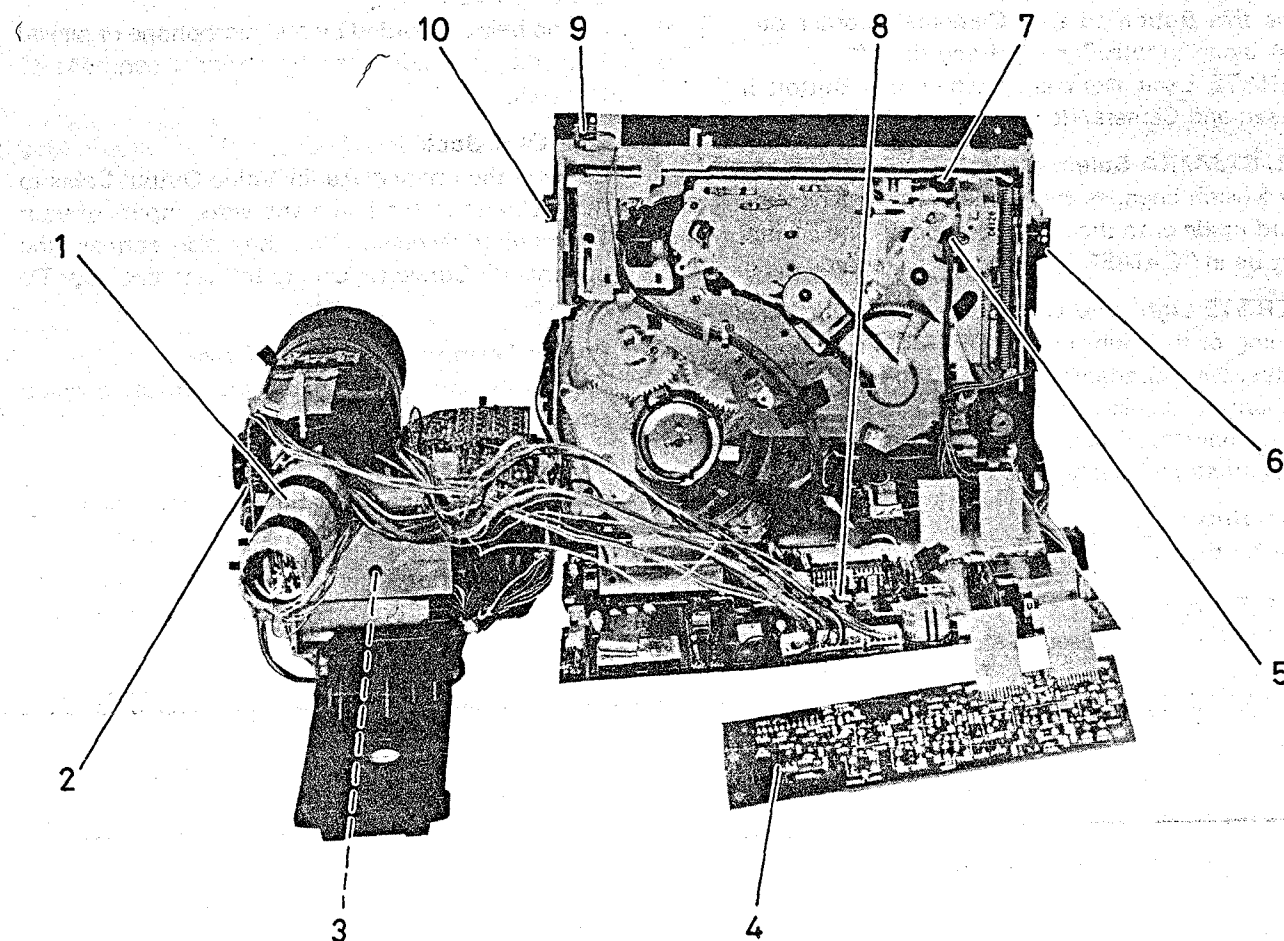


Fig. 1-3

1. Saticon
2. Camera Switch Circuit Board
3. Preamp Circuit Board
4. Function Switch Circuit
5. Reel Sensor
6. Take-up End Sensor
7. Cassette Holder Switch
8. Main Circuit Board
9. Safety Tab Switch
10. Supply End Sensor

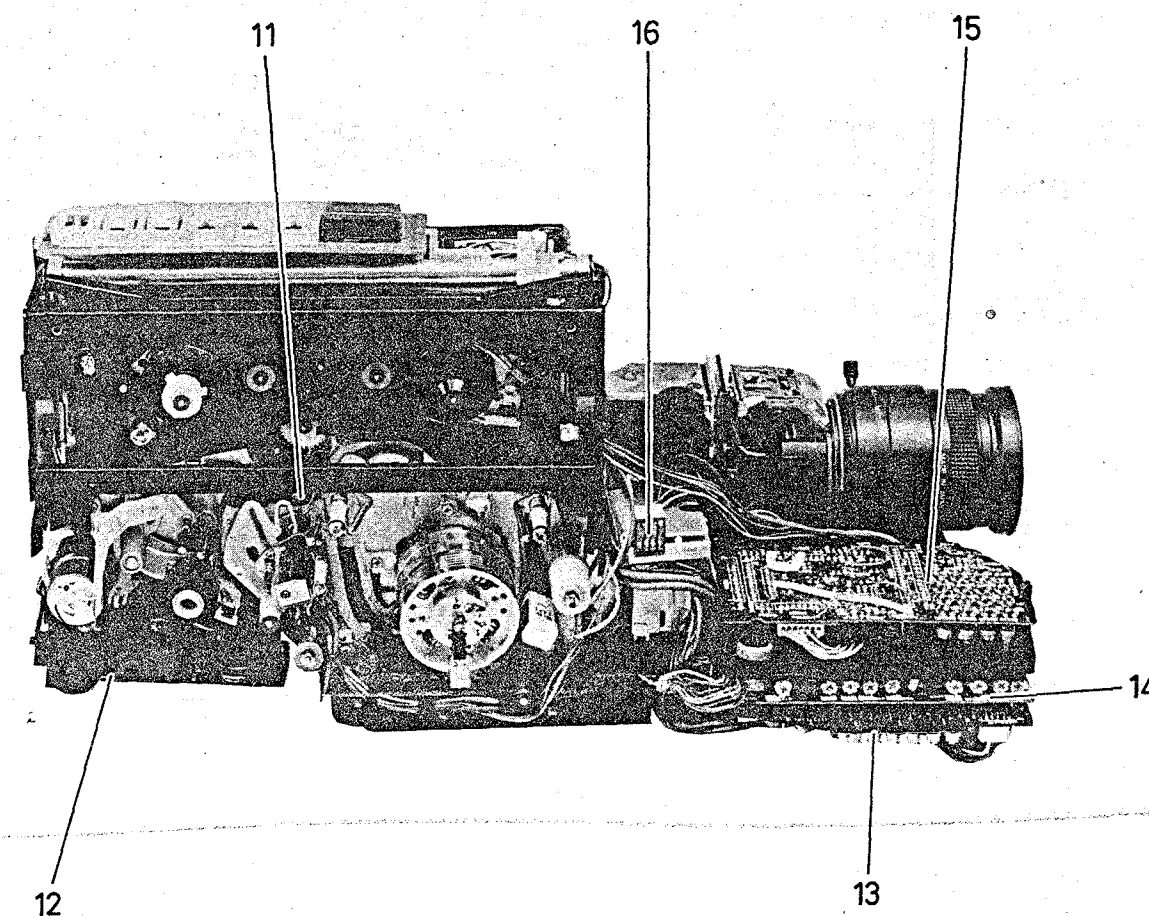


Fig. 1-4

11. End Lamp
12. Audio Circuit Board
13. Process Circuit Board
14. Deflection Circuit Board
15. Regulator Circuit Board
16. 8V Regulator Circuit Board

DISASSEMBLY

CASE

Electronic Viewfinder (EVF) Removal (Fig. 2-1)

1. Disconnect EVF connector.
2. Release the EVF lock and remove the EVF in the direction of the arrow.

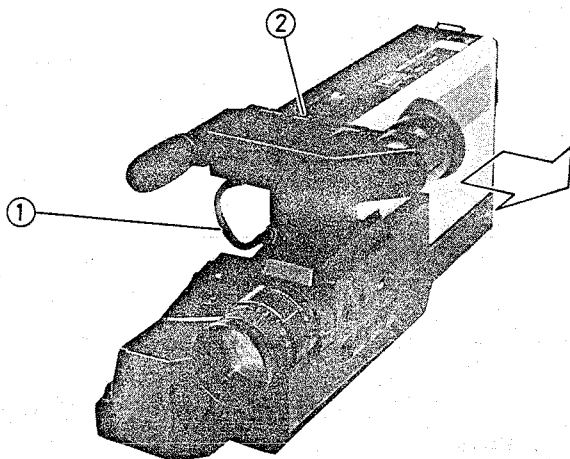


Fig. 2-1 Electronic Viewfinder (EVF) Removal

Electronic Viewfinder (EVF) Shoe Removal (Fig. 2-2)

1. Remove the EVF. (See Fig. 2-1)
2. Remove one (1) screw holding the EVF shoe.
3. Remove the EVF shoe in the direction of the arrow.

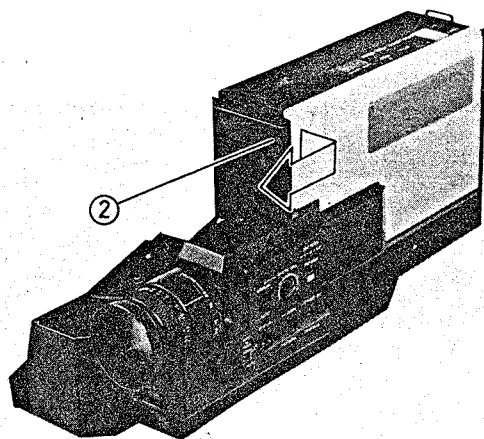


Fig. 2-2 Electronic Viewfinder (EVF) Shoe Removal

Accessory Shoe Removal (Fig. 2-3)

1. Remove two (2) screws holding the accessory shoe.

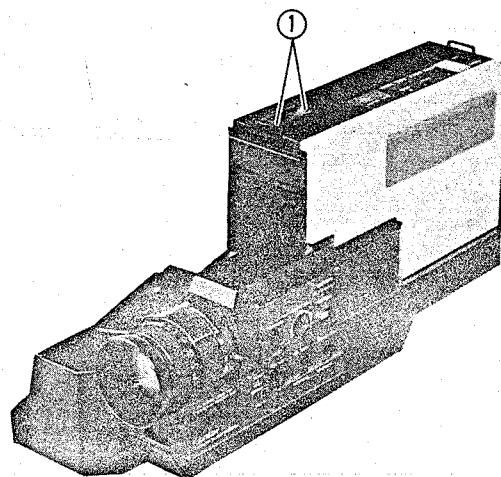


Fig. 2-3 Accessory Shoe Removal

Cassette Lid Removal (Fig. 2-4)

1. Remove two (2) screws holding the cassette lid.
2. Remove the cassette lid in the direction of the arrow.

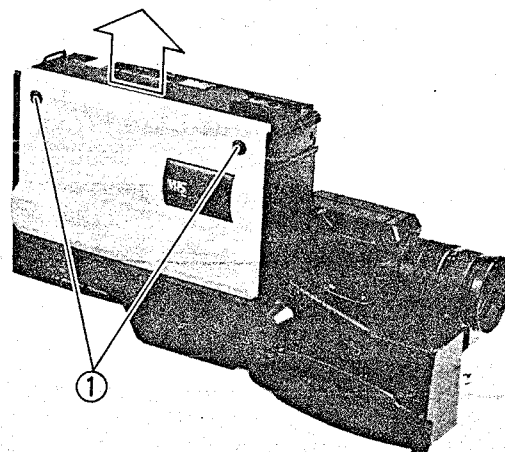


Fig. 2-4 Cassette Lid Removal

Left Case Removal (Fig. 2-5, 2-6)

1. Remove the EVF. (See Fig. 2-1)
2. Remove the EVF shoe. (See Fig. 2-2)
3. Remove the accessory shoe. (See Fig. 2-3)
4. Remove two (2) screws holding the top cover. (See Fig. 2-5)
5. Remove the top cover.
6. Remove one (1) screw holding the left case.
7. Remove five (5) screws holding the left case. (See Fig. 2-6)
8. Remove the left case in the direction of the arrow.

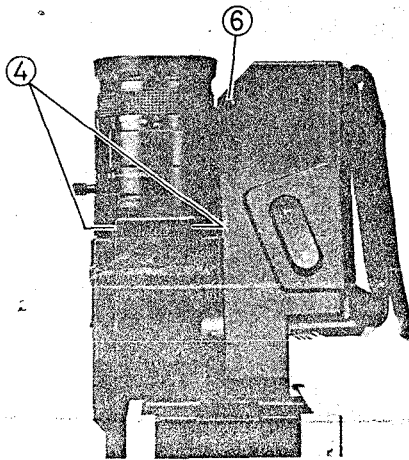


Fig. 2-5 Left Case Removal

Right Case Removal (Figs. 2-7, 2-8)

1. Remove the EVF. (See Fig. 2-1)
2. Remove the EVF shoe. (See Fig. 2-2)
3. Remove the accessory shoe. (See Fig. 2-3)
4. Remove the cassette lid. (See Fig. 2-4)
5. Remove the left case. (See Figs. 2-5, 2-6)
6. Disconnect connector CN909. (See Fig. 2-7)
7. Disconnect three (3) connectors (CN506, CN520, CN621). (See Fig. 2-8)
8. Remove four (4) screws holding the right case.
9. Release one (1) tab.
10. Remove the right case in the direction of the arrow.

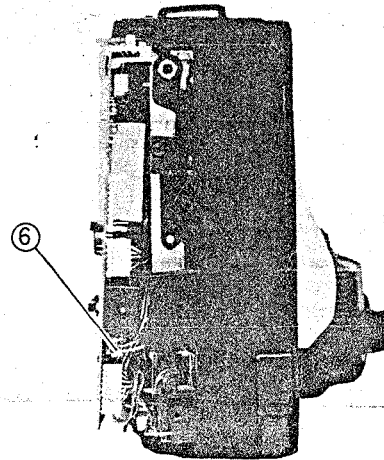


Fig. 2-7 Right Case Removal

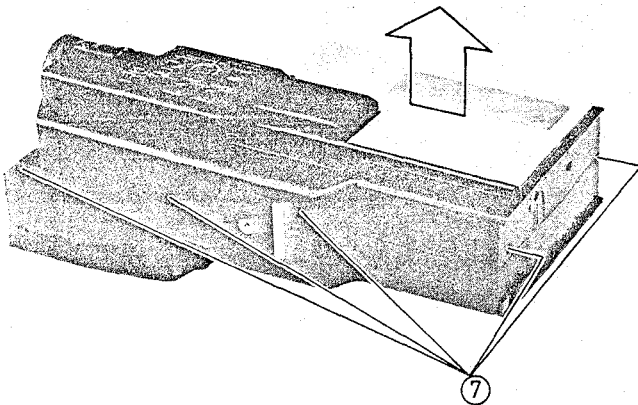


Fig. 2-6 Left Case Removal

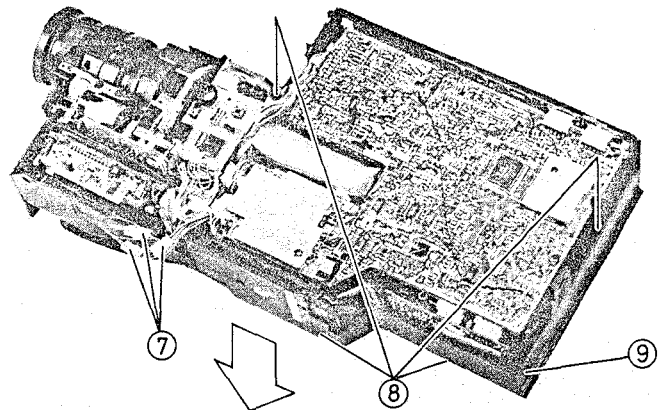


Fig. 2-8 Right Case Removal

Cassette Loading Mechanism — Top View

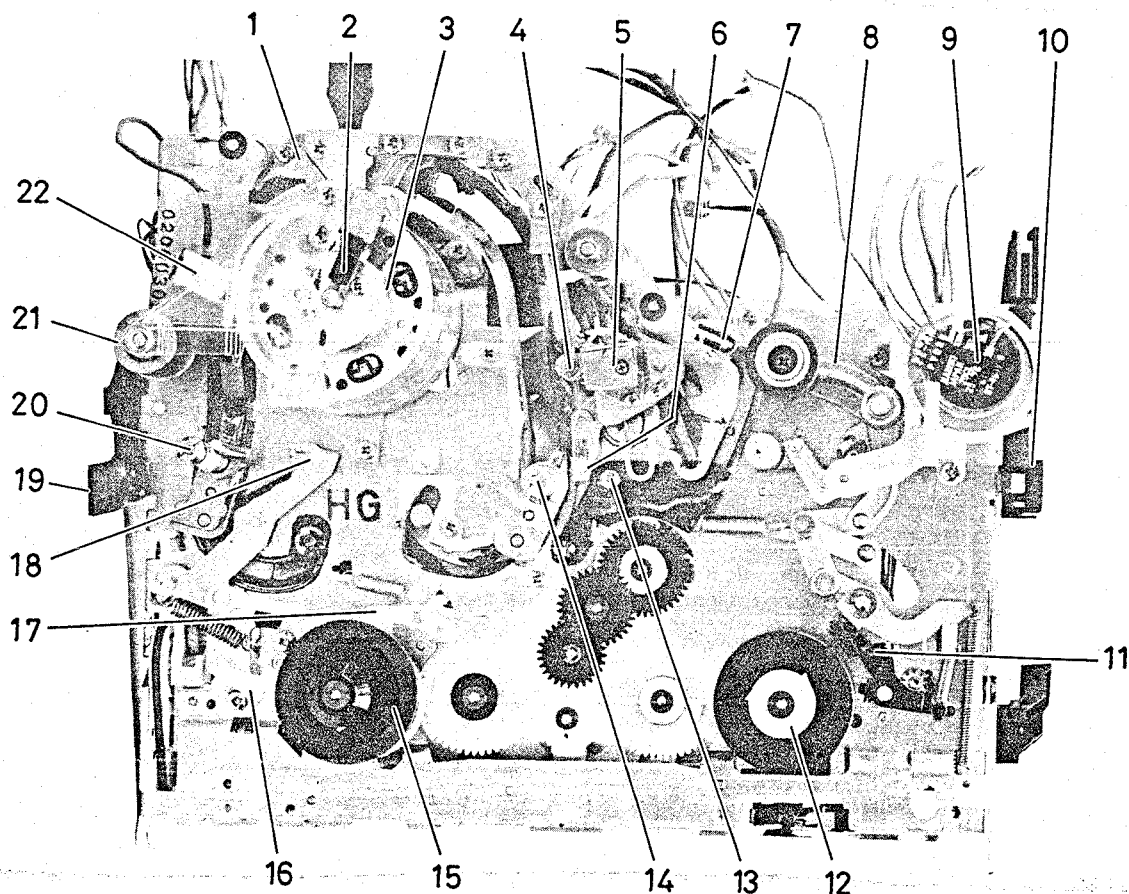


Fig. 2-9 Cassette Loading Mechanism — Top View

- | | |
|--------------------------------|--------------------------|
| 1. Catcher Block | 12. Take-up Reel Disk |
| 2. Cylinder Motor Brush | 13. End Lamp |
| 3. Video Head (Upper cylinder) | 14. Take-up Guide Roller |
| 4. Guide Post | 15. Supply Reel Disk |
| 5. Audio/Control (A/C) Head | 16. Tension Band |
| 6. Guide Arm Assembly | 17. Supply Sub Brake |
| 7. Dew Sensor | 18. Tension Arm |
| 8. Pressure Roller Arm | 19. Supply End Sensor |
| 9. Capstan Motor | 20. Supply Guide Roller |
| 10. Take-up End Sensor | 21. Impedance Roller |
| 11. Take-up Sub Brake | 22. Full Earse (FE) Head |

Cassette Loading Mechanism – Bottom View

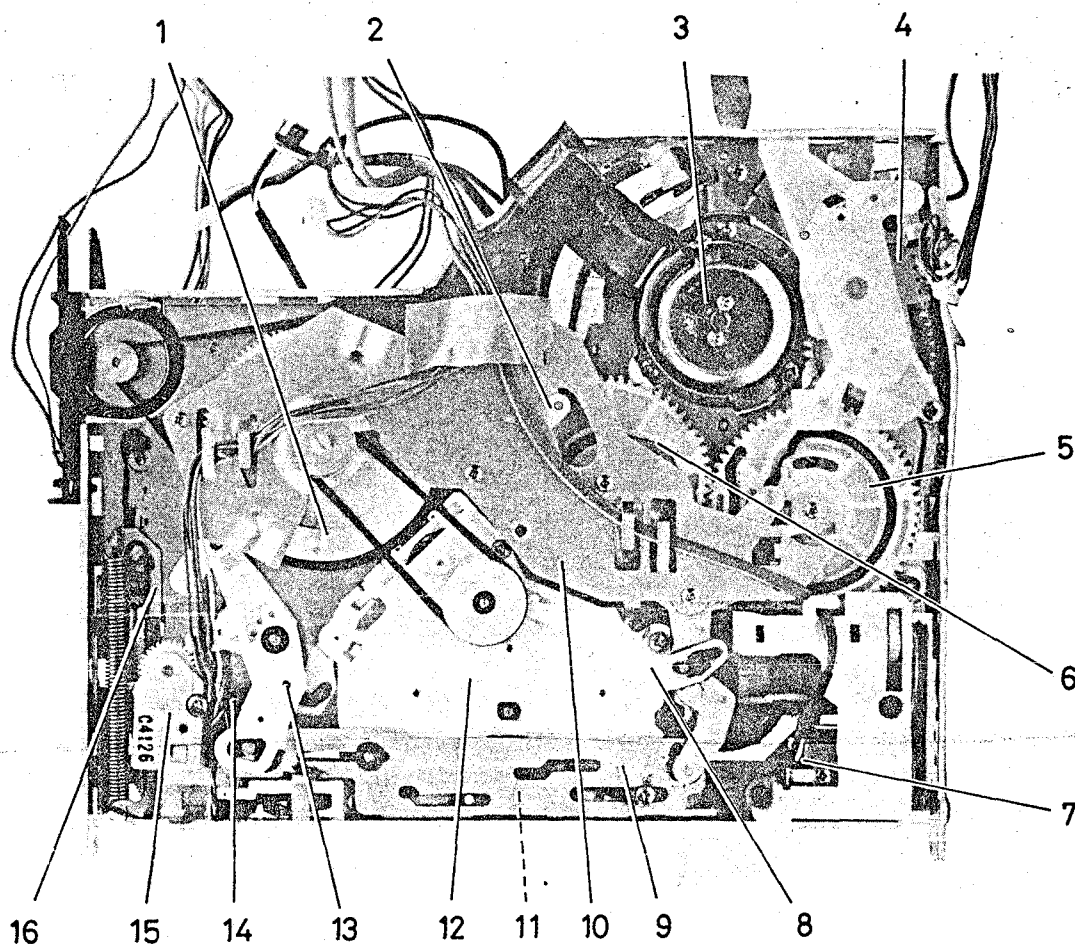


Fig. 2-10 Cassette Loading Mechanism – Bottom View

- | | |
|---------------------------------------|----------------------|
| 1. Capstan Flywheel | 9. Slider |
| 2. A/C Head Control Arm | 10. Cam Gear Plate |
| 3. Lower Cylinder
(Cylinder Motor) | 11. Main Brake Arm |
| 4. Mechanism State Switch | 12. Reel Gear Block |
| 5. Supply Loading Cam Gear | 13. PB/REC Drive Arm |
| 6. Take-up Loading Cam Gear | 14. Reel Sensor |
| 7. Loading Motor | 15. Damper |
| 8. Cam Gear Arm | 16. Up Slider |

CIRCUIT BOARD

Remove the right case and left case as previously given.

Function Switch Circuit Board Removal

(Figs. 2-11, 2-12, 2-13)

1. Release seventeen (17) wires from the wire holder. (See Fig. 2-11)
2. Release two (2) tabs holding the main circuit board.
3. Pull out the function switch circuit board in the direction of the arrow. (See Fig. 2-12)
4. Open the main circuit board and function switch circuit board in the direction of the arrow.
5. Disconnect two (2) flat cables (CN005, CN006). (See Fig. 2-13)

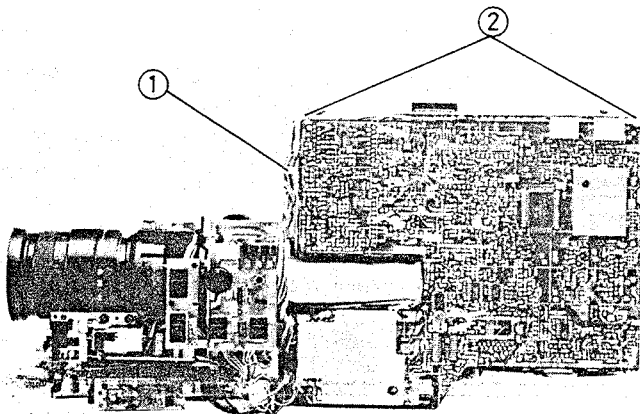


Fig. 2-11 Function Switch Circuit Board Removal

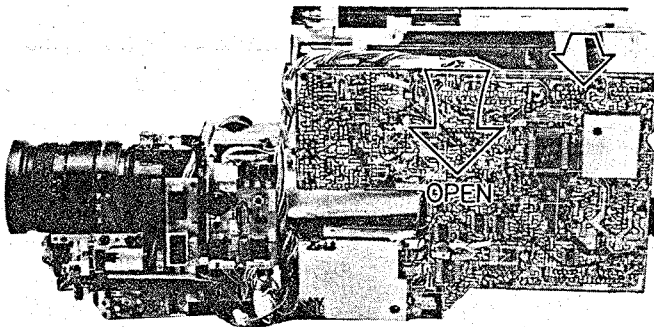


Fig. 2-12 Function Switch Circuit Board Removal

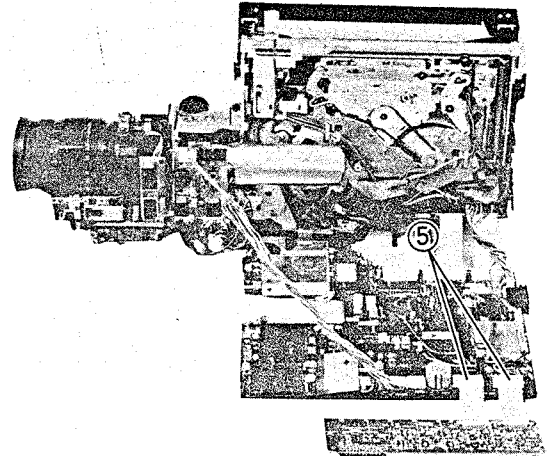


Fig. 2-13 Function Switch Circuit Board Removal

Main Circuit Board Removal (Figs. 2-14, 2-15, 2-16)

1. Remove the function switch circuit board. (See Figs. 2-11, 2-12, 2-13)
2. Disconnect five (5) connectors (CN1501, CN1602, CN611, CN612, CN903). (See Fig. 2-14)
3. Remove the shield cover of luma/chroma section.
4. Disconnect four (4) flat cables (CN408, CN107, CN613, CN214). (See Fig. 2-15)
5. Unsolder one (1) lead.
6. Release two (2) tabs of the board holder. (See Fig. 2-16)
7. Remove the main circuit board from the board holders.

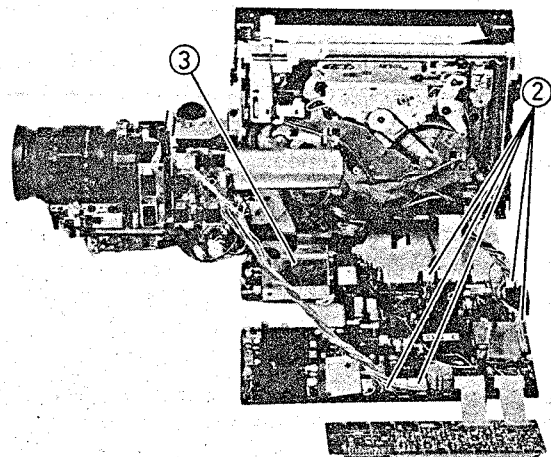


Fig. 2-14 Main Circuit Board Removal

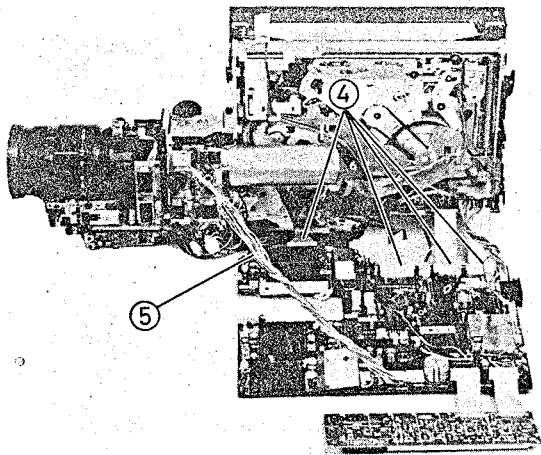


Fig. 2-15 Main Circuit Board Removal

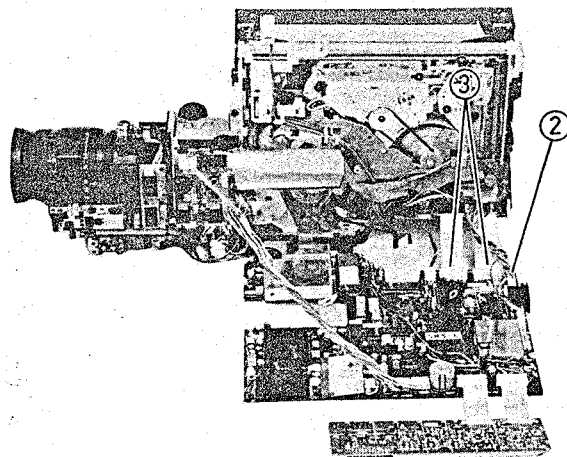


Fig. 2-17 Audio Circuit Board Removal

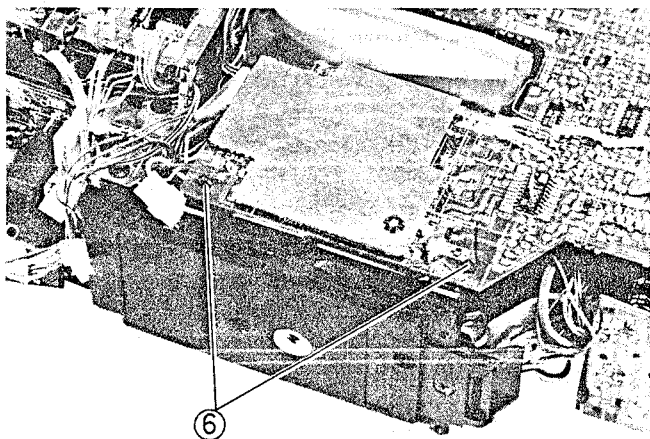


Fig. 2-16 Main Circuit Board Removal

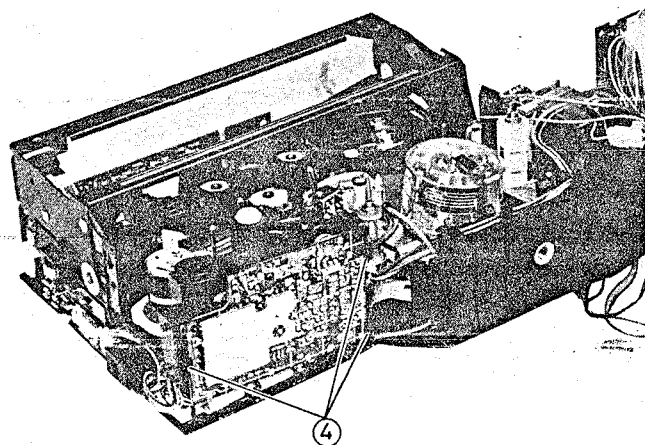


Fig. 2-18 Audio Circuit Board Removal

Audio Circuit Board Removal (Figs. 2-17, 2-18, 2-19)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Disconnect connector CN903. (See Fig. 2-17)
3. Disconnect two (2) flat cables (CN408, CN107).
4. Release three (3) tabs and open the audio circuit board. (See Fig. 2-18)
5. Disconnect twelve (12) connectors (CN415, CN404, CN416, CN125, CN124, CN123, CN122, CN121, CN120, CN119, CN118, CN117). (See Fig. 2-19)
6. Release one (1) tab and remove the A/V OUT connector in the direction of the arrow.

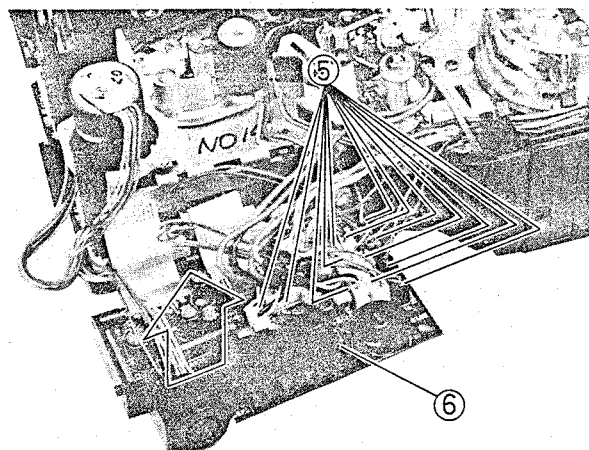


Fig. 2-19 Audio Circuit Board Removal

Process Circuit Board Removal (Figs. 2-20, 2-21)

1. Disconnect six (6) connectors (CN1107, CN018, CN1315, CN1509, CN1619, CN1526). (See Fig. 2-20)
2. Release two (2) tabs and open the process circuit board in the direction of the arrow.

Note: When the description "Open the process circuit board" is given in the disassembly hereafter, the six (6) connectors in item 1 need not to be disconnected.

3. Remove the process circuit board from board holders. (See Fig. 2-21)

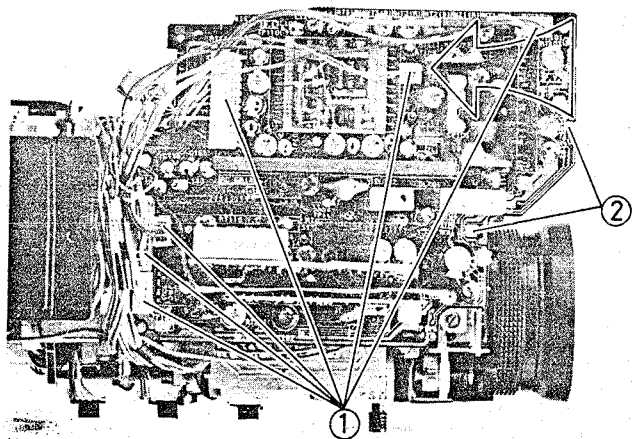


Fig. 2-20 Process Circuit Board Removal

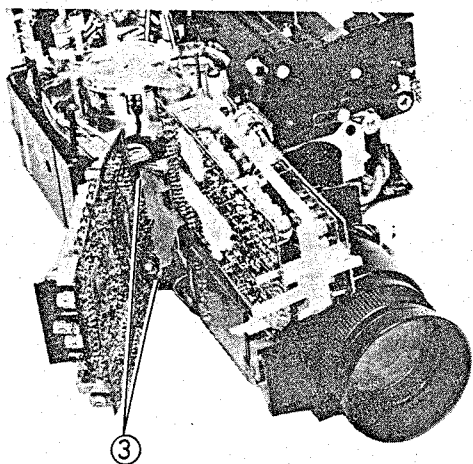


Fig. 2-21 Process Circuit Board Removal

Deflection Circuit Board Removal

(Figs. 2-22, 2-23, 2-24, 2-25, 2-26, 2-27)

1. Disconnect connector CN1501. (See Fig. 2-22)
 2. Disconnect connector CN1509. (See Fig. 2-23)
 3. Disconnect connector CN1525. (See Fig. 2-24)
 4. Remove one (1) screw holding the heat sink of the 8V regulator circuit board and remove the heat sink.
 5. Remove one (1) rivet and release one (1) tab holding the regulator circuit board.
 6. Open the regulator circuit board in the direction of the arrow.
- Note: When the description "Open the regulator circuit board" is given in the disassembly hereafter, the screw in item 4 need not to be removed.
7. Disconnect three (3) connectors (CN1311, CN1312, CN1313) on the deflection circuit board. (See Fig. 2-25)
 8. Disconnect connector CN1310 on the regulator circuit board.
 9. Disconnect two (2) connectors (CN1315, CN1316). (See Fig. 2-26)
 10. Open the process circuit board. (See Fig. 2-20)
 11. Release two (2) tabs and remove the deflection circuit board. (See Fig. 2-27)

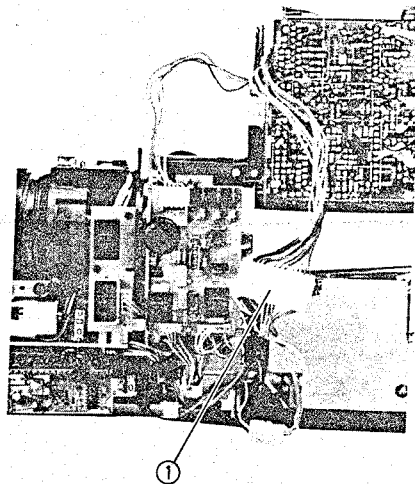


Fig. 2-22 Deflection Circuit Board Removal

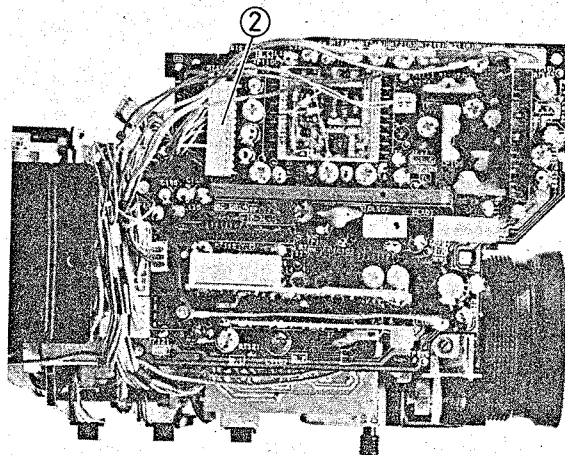


Fig. 2-23 Deflection Circuit Board Removal

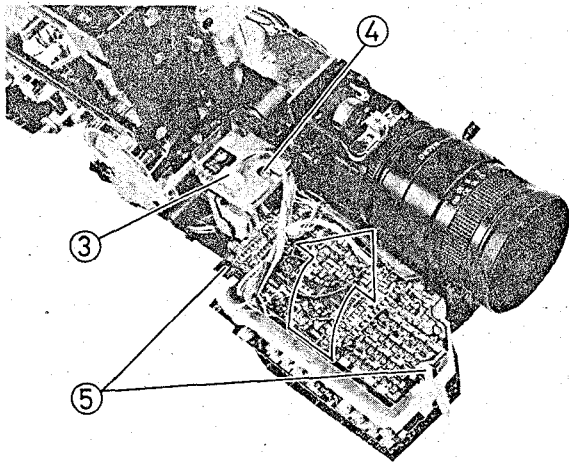


Fig. 2-24 Deflection Circuit Board Removal

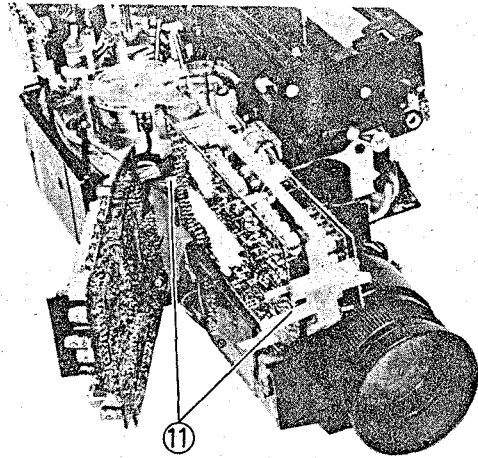


Fig. 2-27 Deflection Circuit Board Removal

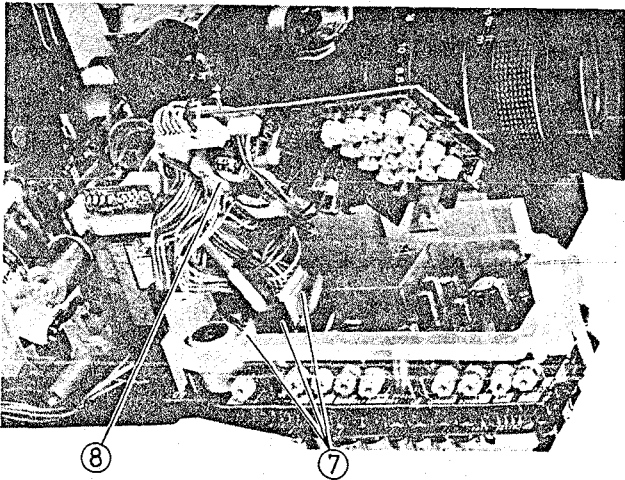


Fig. 2-25 Deflection Circuit Board Removal

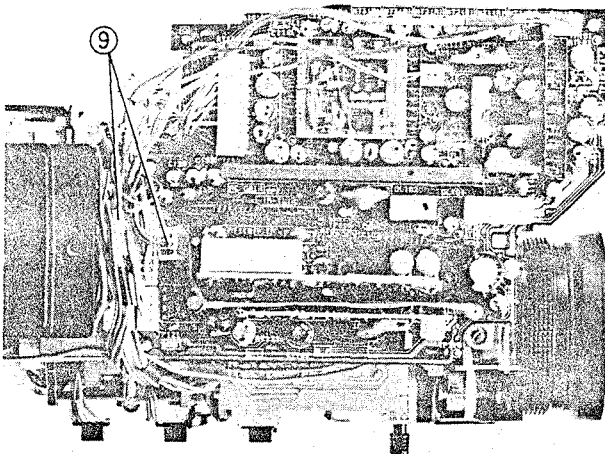


Fig. 2-26 Deflection Circuit Board Removal

Regulator Circuit Board Removal (Fig. 2-28)

1. Remove the deflection circuit board. (See Figs. 2-22, 2-23, 2-24, 2-25, 2-26, 2-27)
2. Disconnect four (4) connectors (CN024, CN1505, CN1508, CN1607) on the regulator circuit board. (See Fig. 2-28)

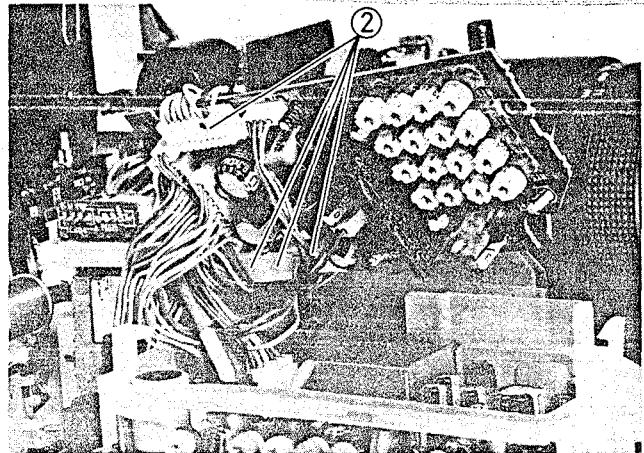


Fig. 2-28 Regulator Circuit Board Removal

Camera Switch Circuit Board Removal (Figs. 2-29, 2-30, 2-31)

1. Open the regulator circuit board. (See Fig. 2-24)
2. Disconnect connector CN1607. (See Fig. 2-29)
3. Disconnect connector CN1619. (See Fig. 2-30)
4. Disconnect connector CN602. (See Fig. 2-31)
5. Remove one (1) screw holding the camera switch circuit board.

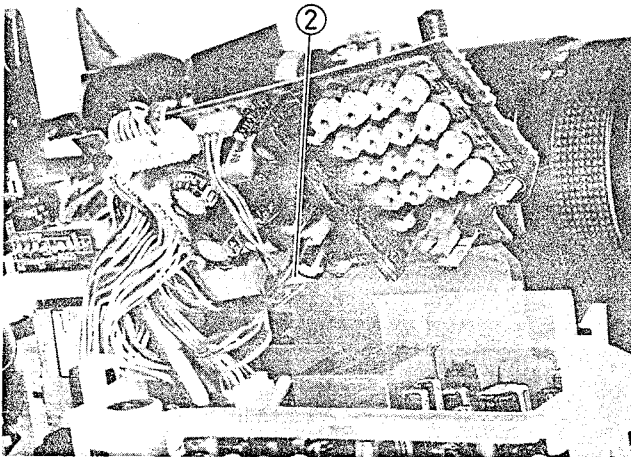


Fig. 2-29 Camera Switch Circuit Board Removal

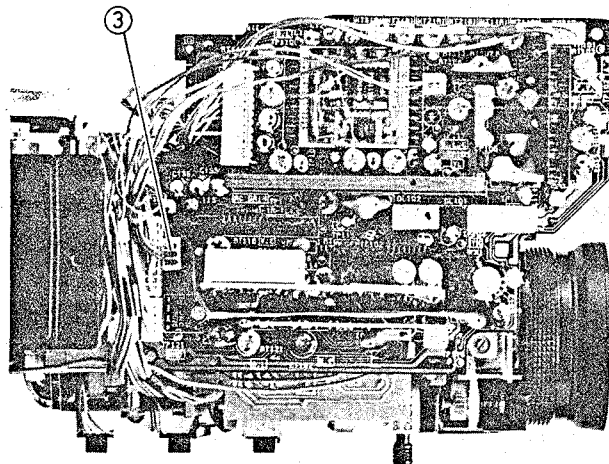


Fig. 2-30 Camera Switch Circuit Board Removal

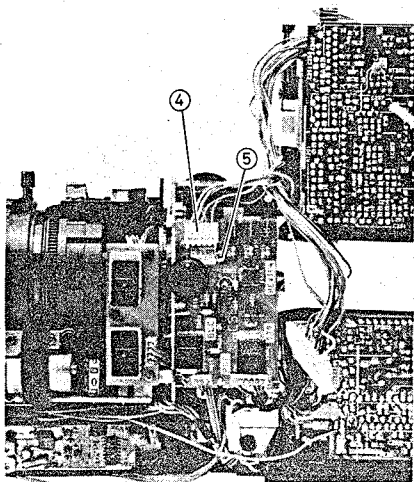


Fig. 2-31 Camera Switch Circuit Board Removal

8V Regulator Circuit Board Removal (Fig. 2-32)

1. Disconnect connector CN1525. (See Fig. 2-32)
2. Remove one (1) screw holding the 8V regulator circuit board.

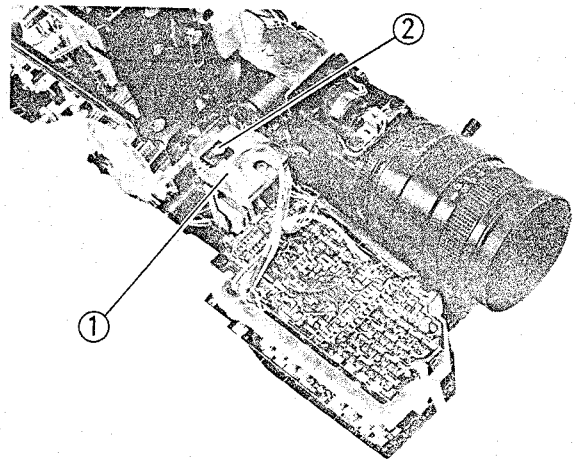


Fig. 2-32 8V Regulator Circuit Board Removal

Preamp Circuit Board Removal

(Figs. 2-33, 2-34, 2-35, 2-36, 2-37, 2-38)

1. Disconnect three (3) connectors (CN1501, CN602, CN404). (See Fig. 2-33)
2. Disconnect connector CN1107. (See Fig. 2-34)
3. Remove two (2) screws holding the camera section and VTR section. (See Figs. 2-35, 2-36)
4. Unsolder two (2) leads. (See Fig. 2-37)
5. Remove two (2) screws holding the preamp shield cover.
6. Unsolder the target lead. (See Fig. 2-38)
7. Remove one (1) screw and one (1) spring washer holding the preamp circuit board.

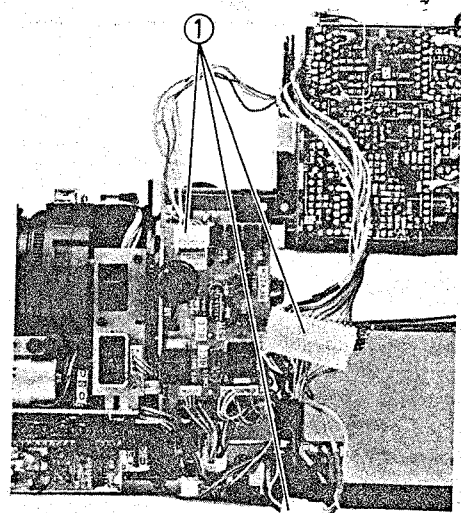


Fig. 2-33 Preamp Circuit Board Removal

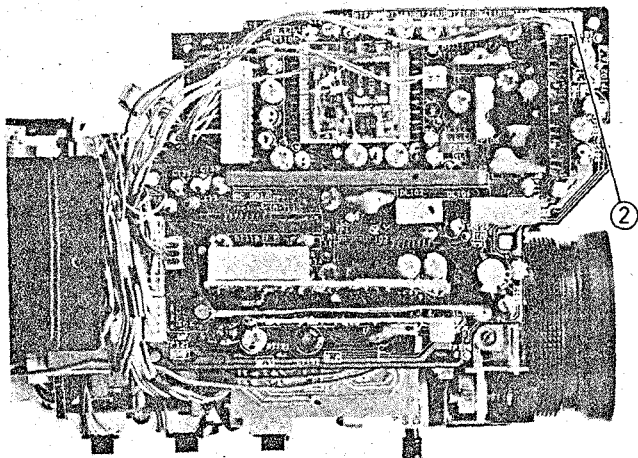


Fig. 2-34 Preamp Circuit Board Removal

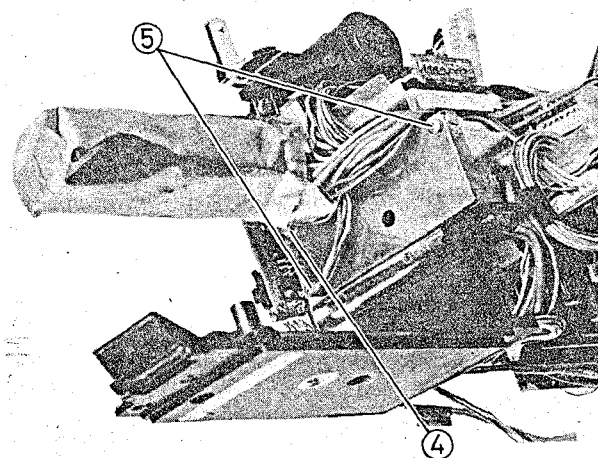


Fig. 2-37 Preamp Circuit Board Removal

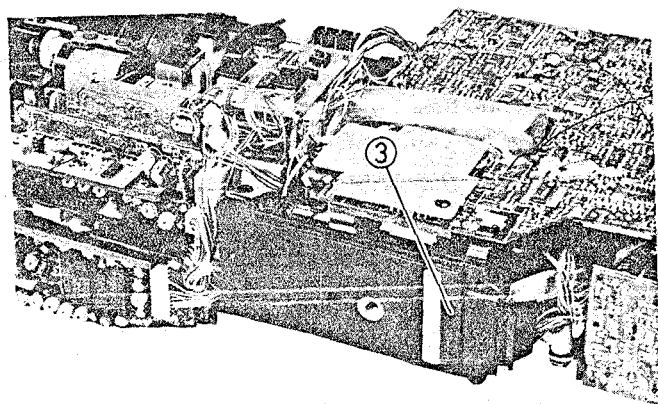


Fig. 2-35 Preamp Circuit Board Removal

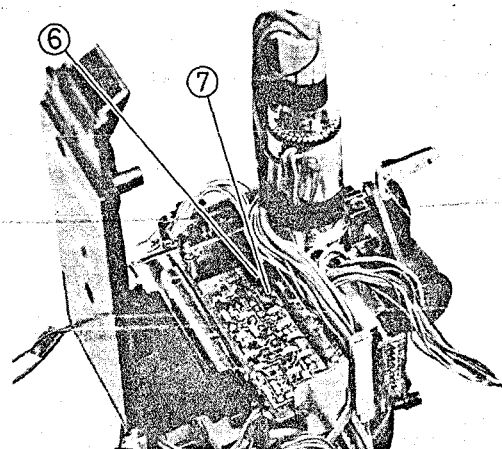


Fig. 2-38 Preamp Circuit Board Removal

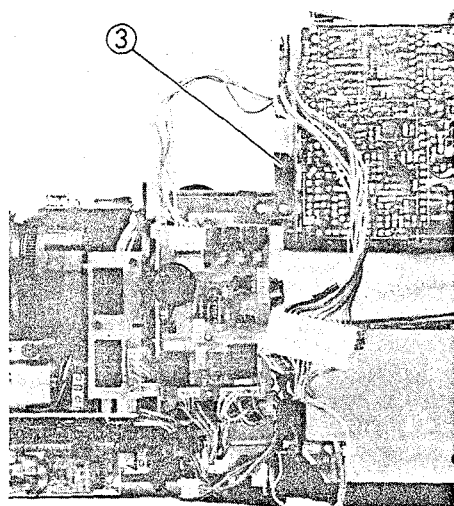


Fig. 2-36 Preamp Circuit Board Removal

EVF Connector Removal (Figs. 2-39, 2-40, 2-41)

1. Disconnect connector CN1505. (See Fig. 2-39)
2. Disconnect connector CN404. (See Fig. 2-40)
3. Remove one (1) screw holding the EVF connector. (See Fig. 2-41)

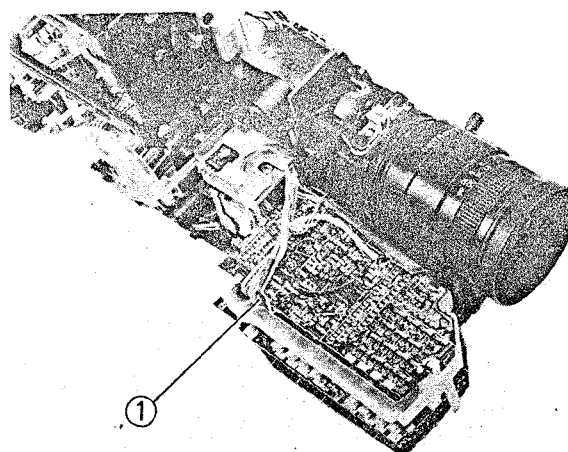


Fig. 2-39 EVF Connector Removal

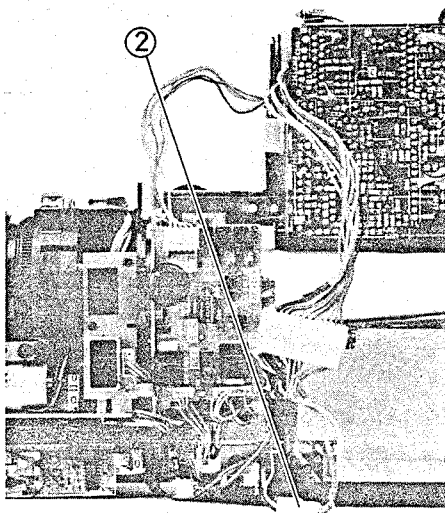


Fig. 2-40 EVF Connector Removal

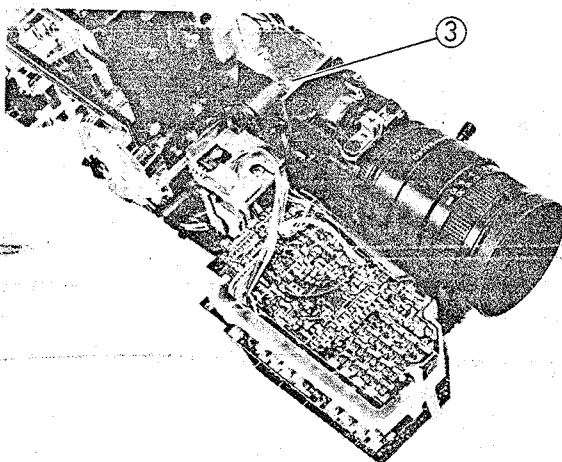


Fig. 2-41 EVF Connector Removal

Zoom Switch Circuit Board Removal (Fig. 2-42)

1. Remove two (2) screws holding the zoom switch circuit board holder.

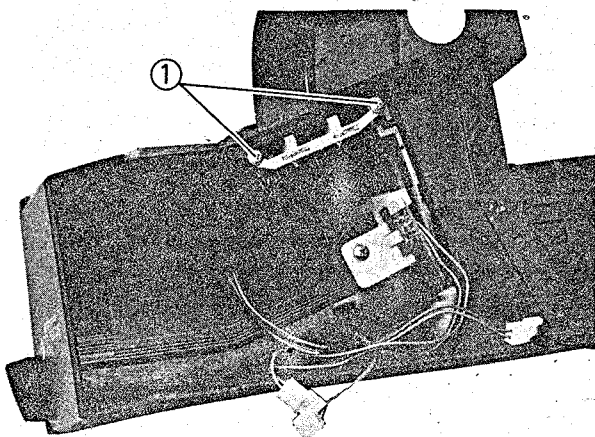


Fig. 2-42 Zoom Switch Circuit Board Removal

VTR REC Switch Circuit Board Removal (Figs. 2-43, 2-44)

1. Remove one (1) screw holding the VTR REC switch circuit board holder. (See Fig. 2-43)
2. Remove the VTR REC switch circuit board holder.
3. Release one (1) tab and remove the VTR REC switch circuit board. (See Fig. 2-44)

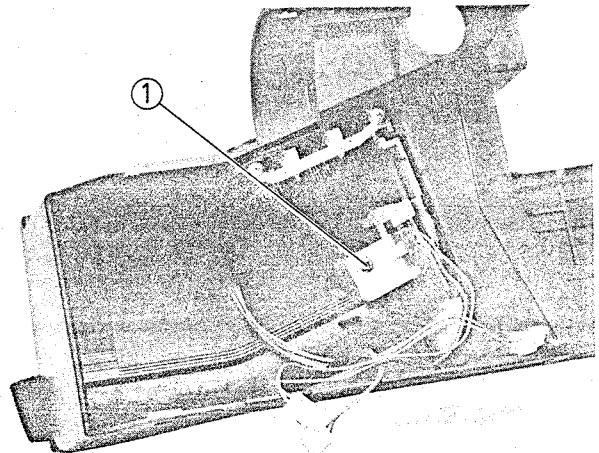


Fig. 2-43 VTR REC Switch Circuit Board Removal

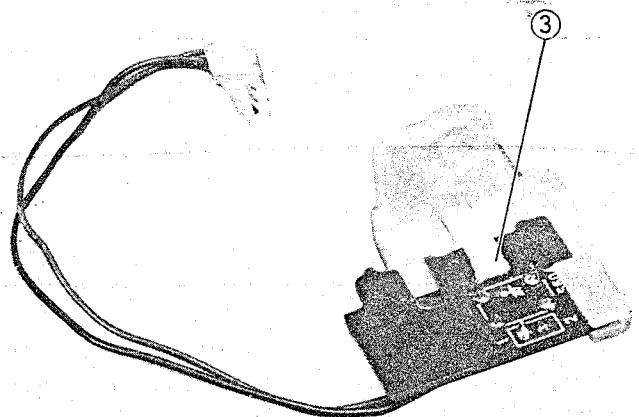


Fig. 2-44 VTR REC Switch Circuit Board Removal

CASSETTE LOADING MECHANISM

Remove the right case and left case as previously given.

Cassette Loading Mechanism Removal

(Figs. 2-45, 2-46, 2-47)

1. Remove the function circuit board. (See Figs. 2-11, 2-12, 2-13)
2. Remove the main circuit board. (See Figs. 2-14, 2-15, 2-16)
3. Remove the audio circuit board. (See Figs. 2-17, 2-18, 2-19)
4. Disconnect three (3) connectors (CN1501, CN602, CN404). (See Fig. 2-45)
5. Remove two (2) screws holding the camera section and VTR section. (See Figs. 2-46, 2-47)

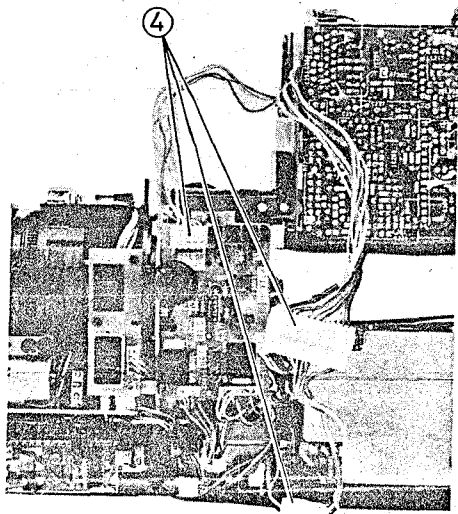


Fig. 2-45 Cassette Loading Mechanism Removal

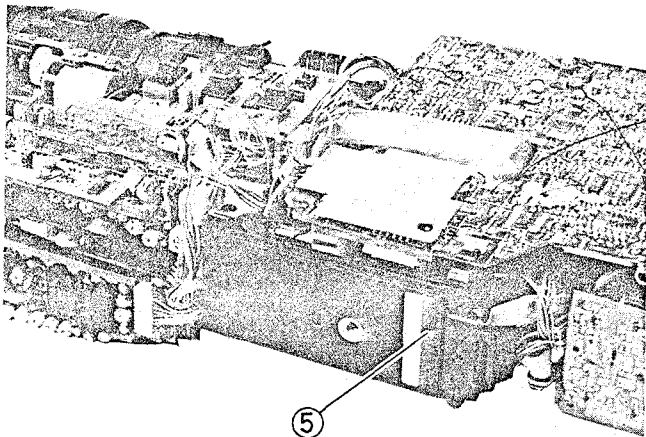


Fig. 2-46 Cassette Loading Mechanism Removal

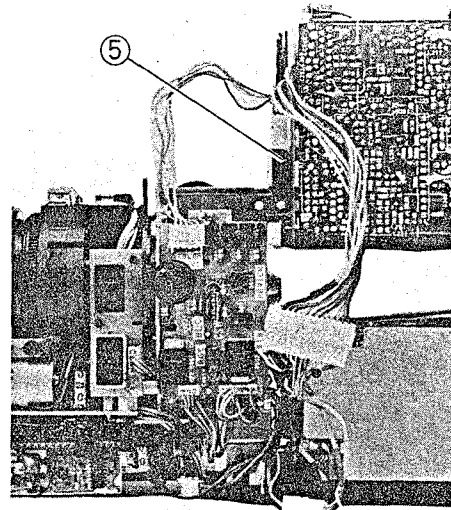


Fig. 2-47 Cassette Loading Mechanism Removal

Cassette Holder Removal (Figs. 2-48, 2-49, 2-50, 2-51, 2-52)

1. Disconnect three (3) connectors (CN501, CN602, CN404). (See Fig. 2-45)
2. Remove two (2) screws holding the camera section and VTR section. (See Figs. 2-46, 2-47)
3. Remove one (1) screw holding the safety tab switch. (See Fig. 2-48)
4. Release one (1) tab and lift up the cassette holder. (See Fig. 2-49)
5. Remove the cassette holder spring. (See Fig. 2-49)
6. Remove two (2) screws holding the cassette holder. (See Figs. 2-49, 2-50)
7. Release two (2) tabs. (See Fig. 2-51, 2-52)
8. Move the front arm in the direction of the arrow (A).
9. Move the rear arm in the direction of the arrow (B).

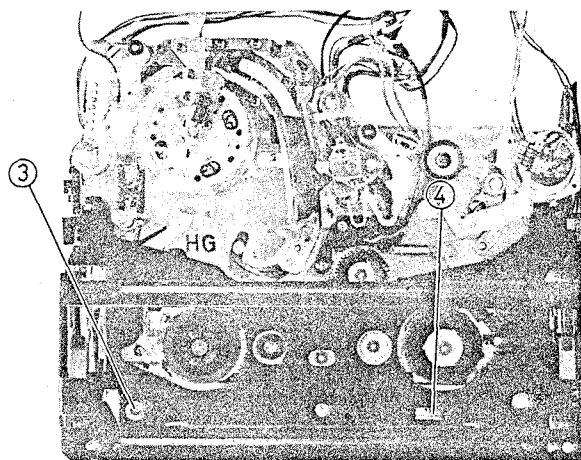


Fig. 2-48 Cassette Holder Removal

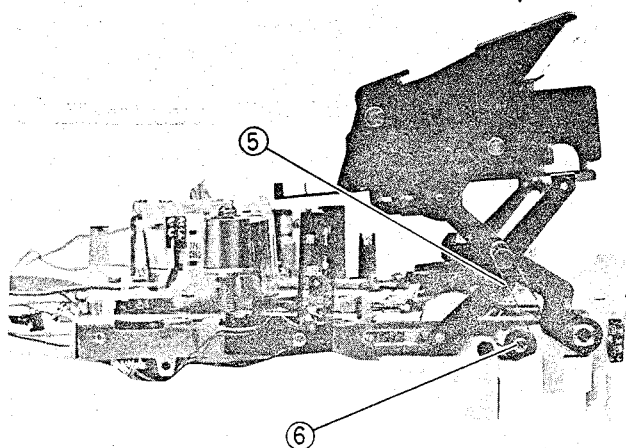


Fig. 2-49 Cassette Holder Removal

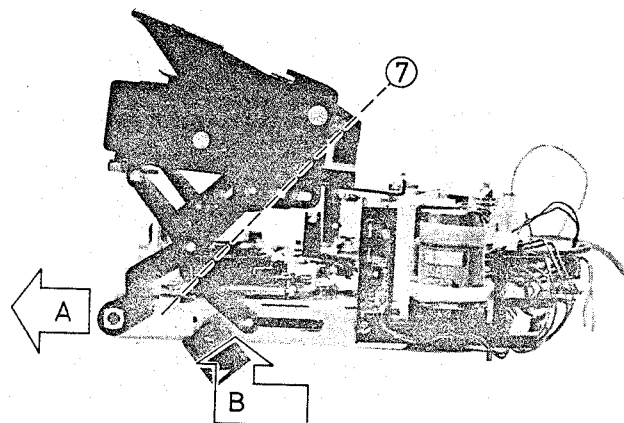


Fig. 2-52 Cassette Holder Removal

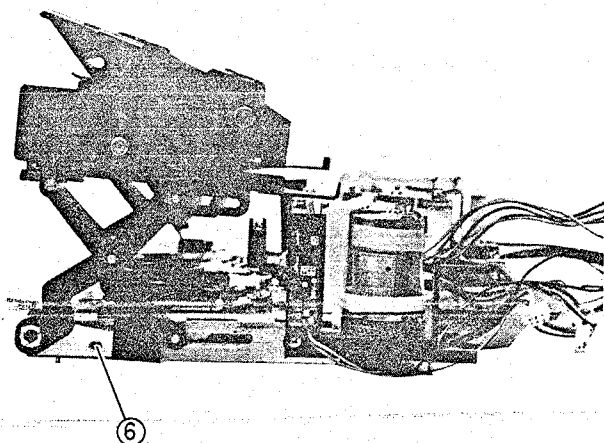


Fig. 2-50 Cassette Holder Removal

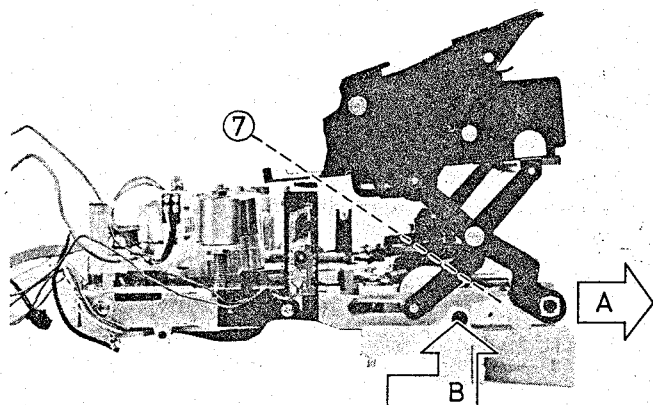


Fig. 2-51 Cassette Holder Removal

Video Head (Upper Cylinder) Removal (Figs. 2-53, 2-54)

1. Remove one (1) screw holding the cylinder motor brush. (See Fig. 2-53)
2. Unsolder eight (8) leads on the video head (upper cylinder). (See Fig. 2-54)
3. Remove two (2) screws and pull out the video head (upper cylinder).

Note: Be careful that your fingers or tools do not touch the video head tips during work.

Install the video head by the reverse procedure to removal.

Tighten the two (2) video head holding screws alternately.

Adjust as follows after installing the video head.

- * Tracking Preset Adjustment
- * A/C Head Adjustment
- * Head Switching Point Adjustment
- * Record Chroma and Luminance Level Adjustment

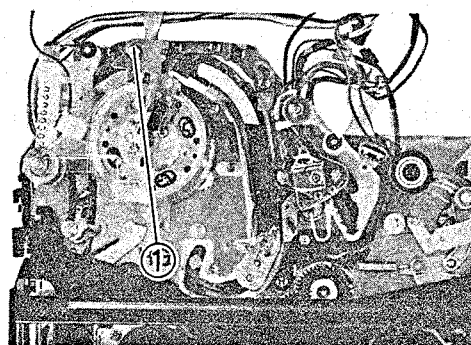


Fig. 2-53 Video Head (Upper Cylinder) Removal

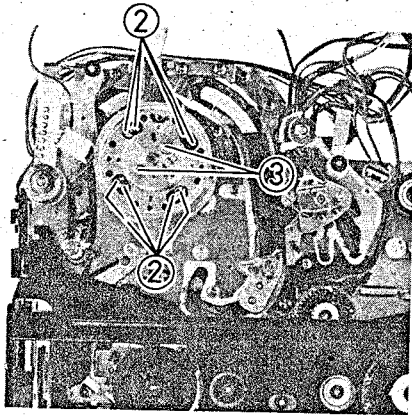


Fig. 2-54 Video Head (Upper Cylinder) Removal

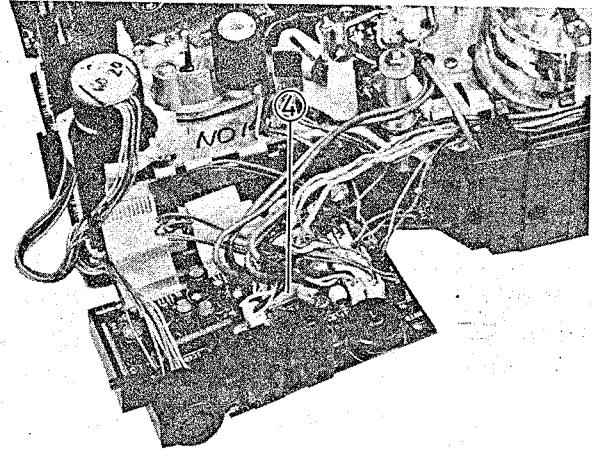


Fig. 2-56 Audio/Control (A/C) Head Removal

Audio/Control (A/C) Head Removal (Figs. 2-55, 2-56, 2-57)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-12, 2-13)
2. Disconnect connector CN611. (See Fig. 2-55)
3. Open the audio circuit board. (See Fig. 2-18)
4. Disconnect connector CN415. (See Fig. 2-56)
5. Release wires from wire holder. (See Fig. 2-57)
6. Remove three (3) screws holding the A/C head.

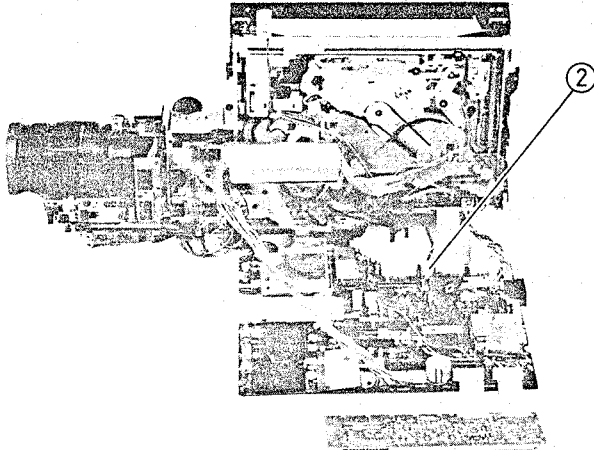


Fig. 2-55 Audio/Control (A/C) Head Removal

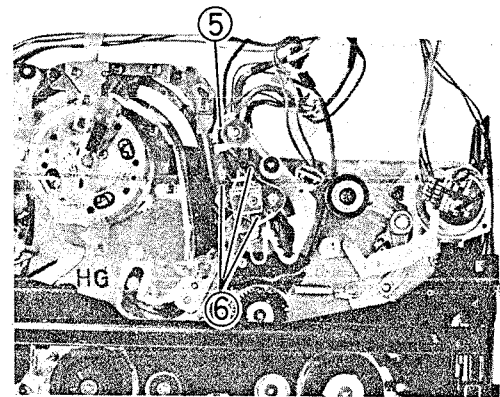


Fig. 2-57 Audio/Control (A/C) Head Removal

Full Erase (FE) Head Removal (Figs. 2-58, 2-59, 2-60)

1. Open the audio circuit board. (See Fig. 2-18)
2. Disconnect connector CN416. (See Fig. 2-58)
3. Remove the spring between the FE head base and chassis. (See Fig. 2-59)
4. Remove the washer and pull out the FE head base.
5. Remove one (1) screw holding the FE head. (See Fig. 2-2-60)

Note: Take care of the spring position when reinstalling.

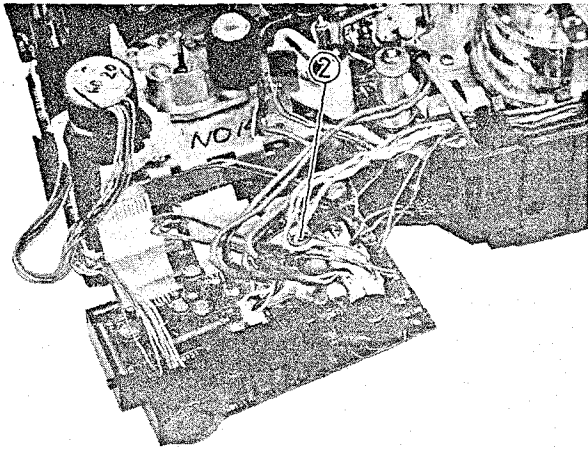


Fig. 2-58 Full Erase (FE) Head Removal

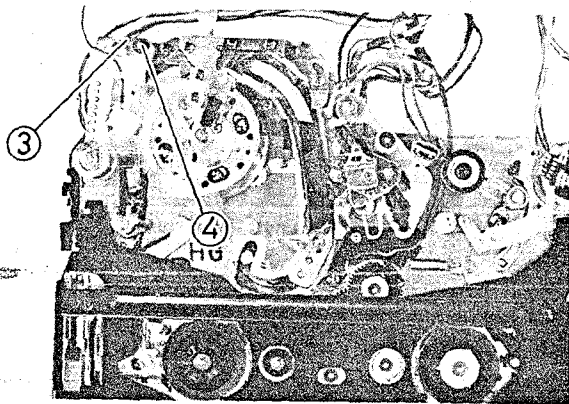


Fig. 2-59 Full Erase (FE) Head Removal

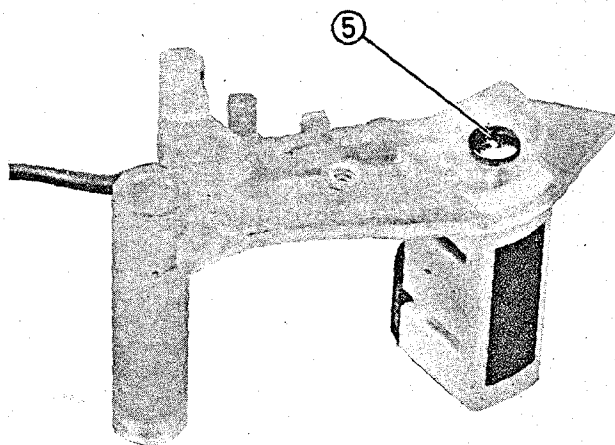


Fig. 2-60 Full Erase (FE) Head Removal

Supply End Sensor Removal (Figs. 2-61, 2-62, 2-63, 2-64)

1. Open the audio circuit board. (See Fig. 2-18)
2. Disconnect connector CN123. (See Fig. 2-61)
3. Remove two (2) screws holding the camera section and VTR section. (See Figs. 2-62, 2-63)
4. Release one (1) tab. (See Fig. 2-64)

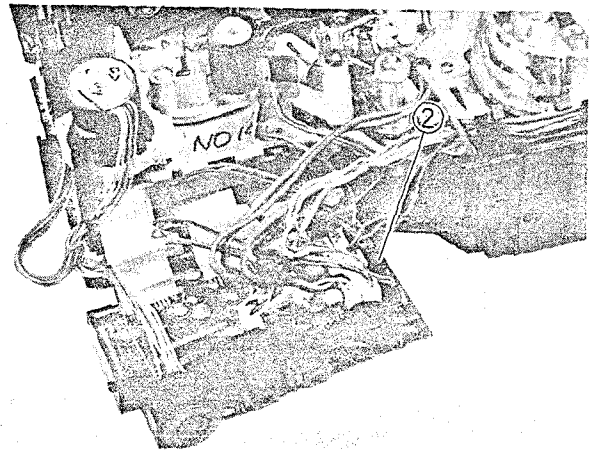


Fig. 2-61 Supply End Sensor Removal

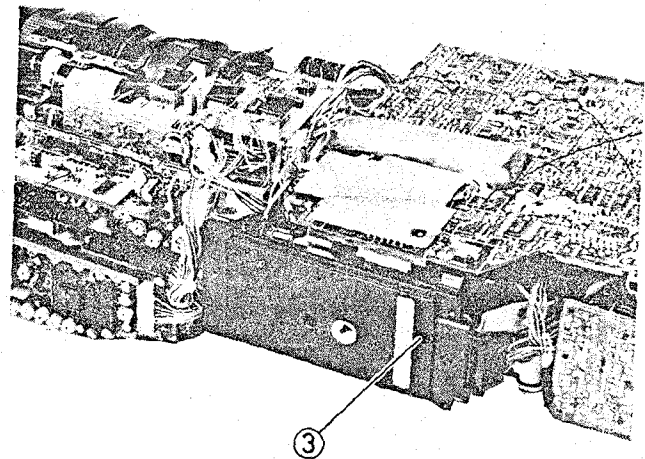


Fig. 2-62 Supply End Sensor Removal

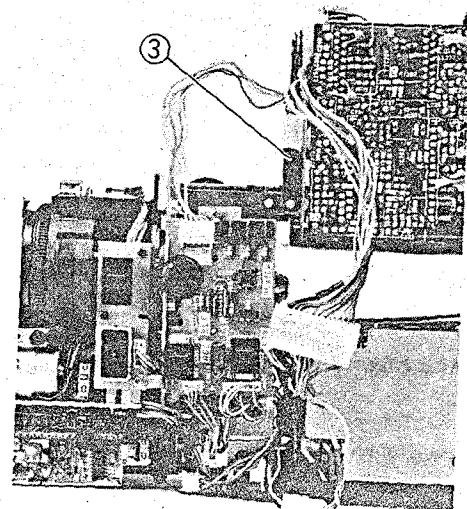


Fig. 2-63 Supply End Sensor Removal

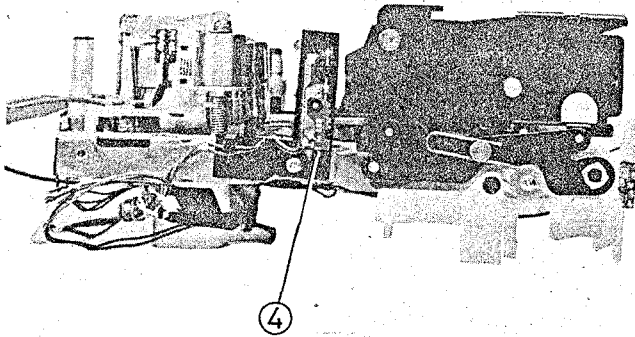


Fig. 2-64 Supply End Sensor Removal

Take-up End Sensor Removal (Figs. 2-65, 2-66)

1. Open the audio circuit board. (See Fig. 2-18)
2. Disconnect connector CN124. (See Fig. 2-65)
3. Release one (1) tab and remove the take-up end sensor. (See Fig. 2-66)

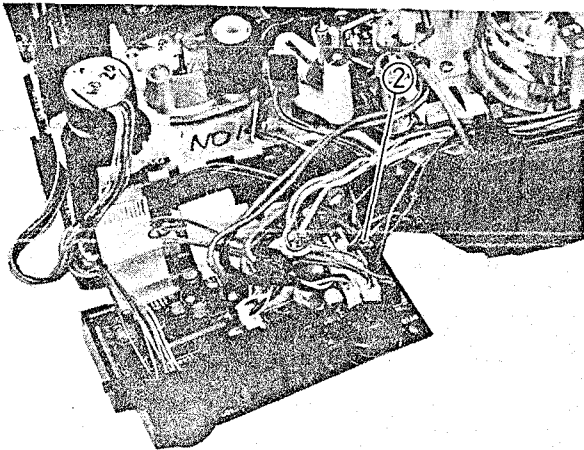


Fig. 2-65 Take-up End Sensor Removal

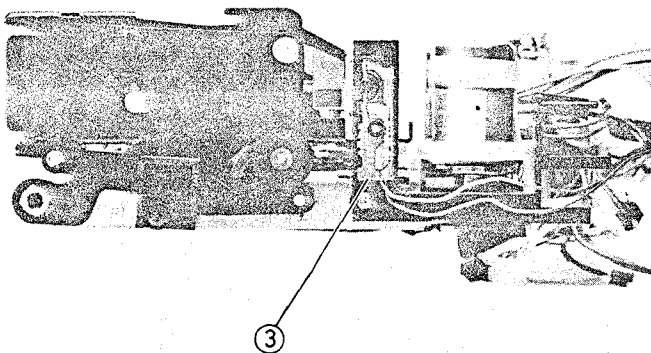


Fig. 2-66 Take-up End Sensor Removal

Reel Sensor Removal (Figs. 2-67, 2-68)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Open the audio circuit board. (See Fig. 2-18)
3. Disconnect connector CN119. (See Fig. 2-67)
4. Remove the wires from the wire holders. (See Fig. 2-68)
5. Remove the PB/REC drive arm. (See Fig. 2-109)
6. Remove the slider. (See Fig. 2-114)
7. Remove one (1) screw holding the reel sensor.

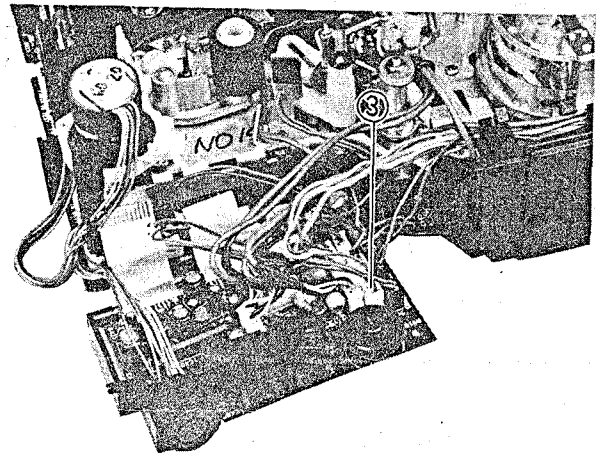


Fig. 2-67 Reel Sensor Removal

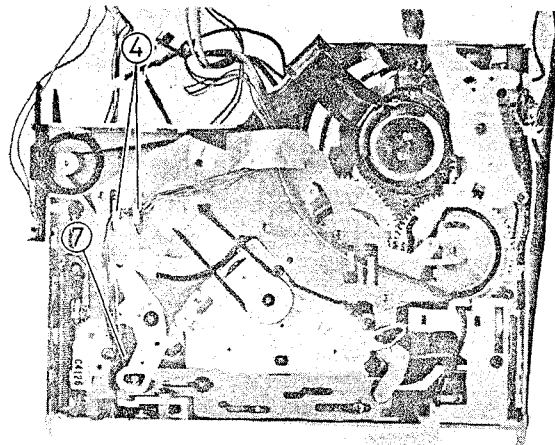


Fig. 2-68 Reel Sensor Removal

Dew Sensor Removal (Figs. 2-69, 2-70)

1. Open the audio circuit board. (See Fig. 2-18)
2. Disconnect connector CN120. (See Fig. 2-69)
3. Remove one (1) screw holding the dew sensor. (See Fig. 2-70)

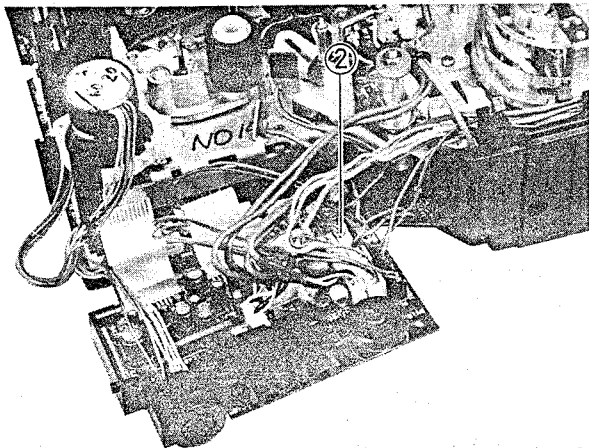


Fig. 2-69 Dew Sensor Removal

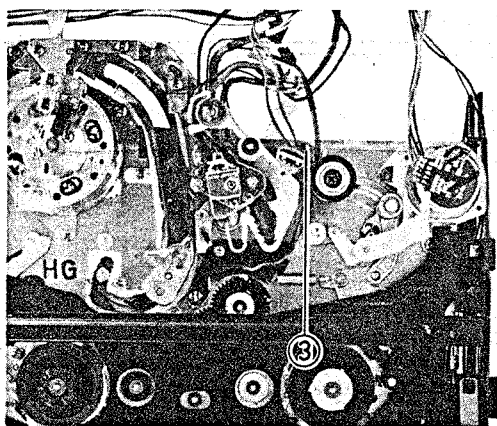


Fig. 2-70 Dew Sensor Removal

Cassette Holder Switch Removal (Figs. 2-71, 2-72, 2-73)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Open the audio circuit board. (See Fig. 2-18)
3. Disconnect connector CN121. (See Fig. 2-71)
4. Remove the cassette holder. (See Figs. 2-48, 2-49, 2-50, 2-51, 2-52)
5. Remove the wires from the wire holders. (See Fig. 2-72)
6. Remove one (1) screw holding the cassette holder switch. (See Fig. 2-73)

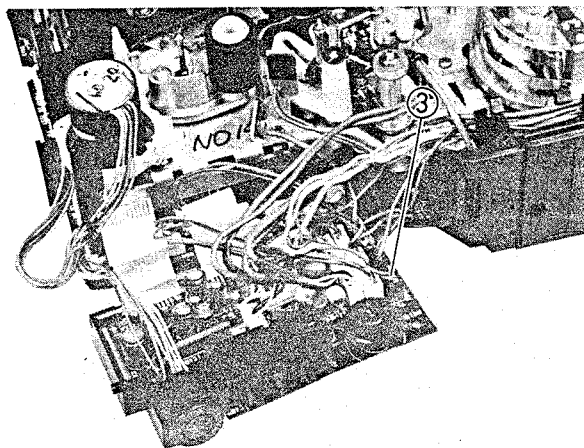


Fig. 2-71 Cassette Holder Switch Removal

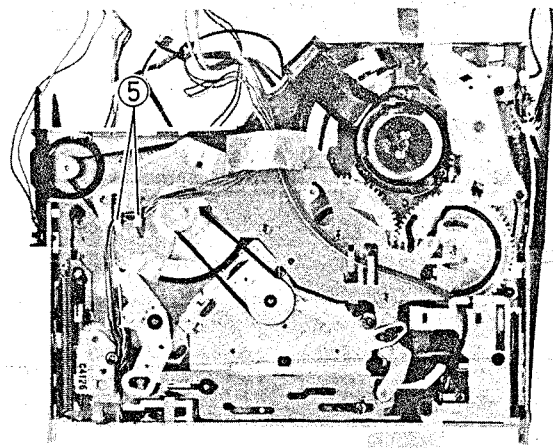


Fig. 2-72 Cassette Holder Switch Removal

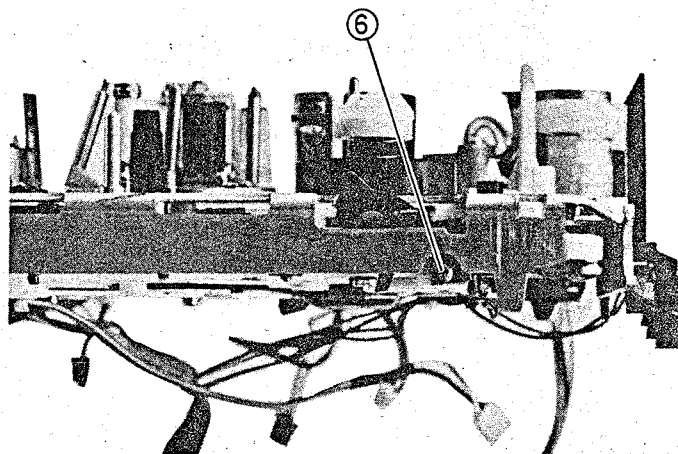


Fig. 2-73 Cassette Holder Switch Removal

Safety Tab Switch Removal (Figs. 2-74, 2-75, 2-76)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Open the audio circuit board. (See Fig. 2-18)
3. Disconnect connector CN122. (See Fig. 2-74)
4. Remove the wires from the wire holders. (See Fig. 2-75)
5. Remove one (1) screw holding the safety tab switch. (See Fig. 2-76)

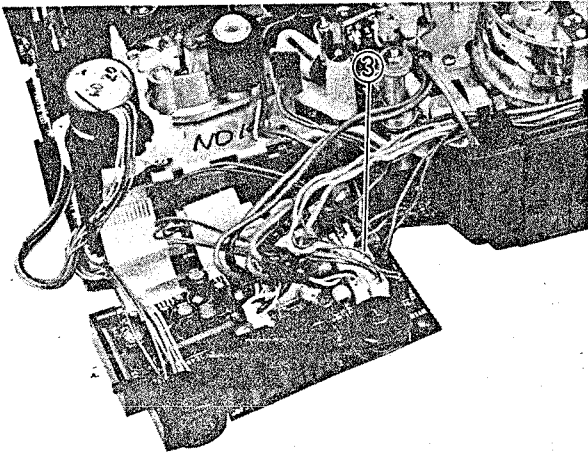


Fig. 2-74 Safety Tab Switch Removal

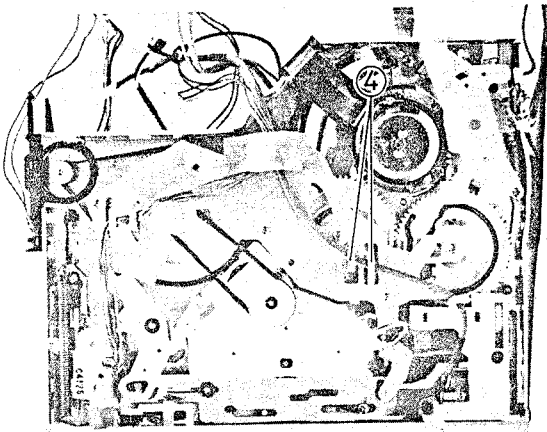


Fig. 2-75 Safety Tab Switch Removal

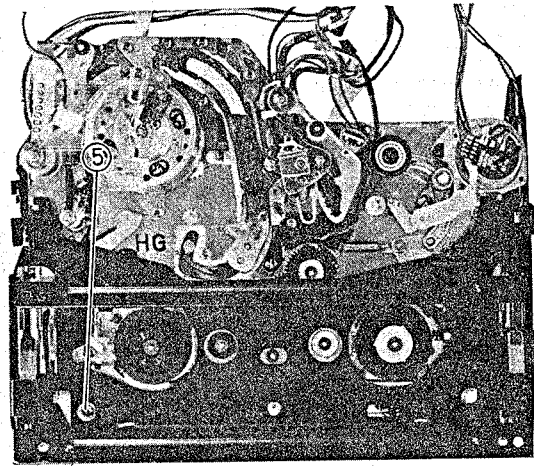


Fig. 2-76 Safety Tab Switch Removal

Mechanism State Switch Removal (Figs. 2-77, 2-78, 2-79)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Open the audio circuit board. (See Figs. 2-18)
3. Disconnect connector CN117. (See Fig. 2-77)
4. Remove one (1) screw holding the mechanism state switch. (See Fig. 2-78)
5. Remove the mechanism state switch holder in the direction of the arrow.
6. Remove the washer and remove the cam gear T. (See Fig. 2-79)
7. Remove one (1) screw holding the mechanism state switch.

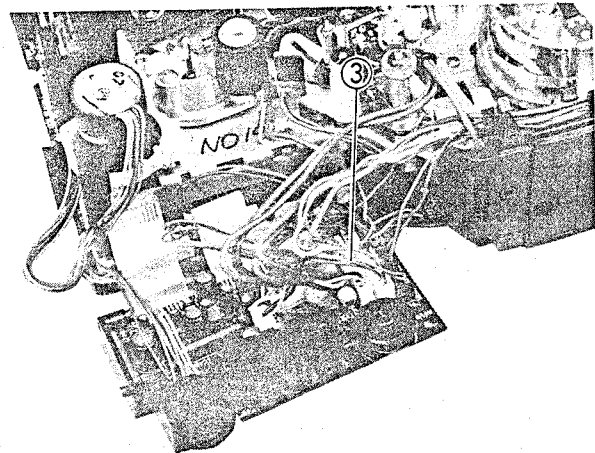


Fig. 2-77 Mechanism State Switch Removal

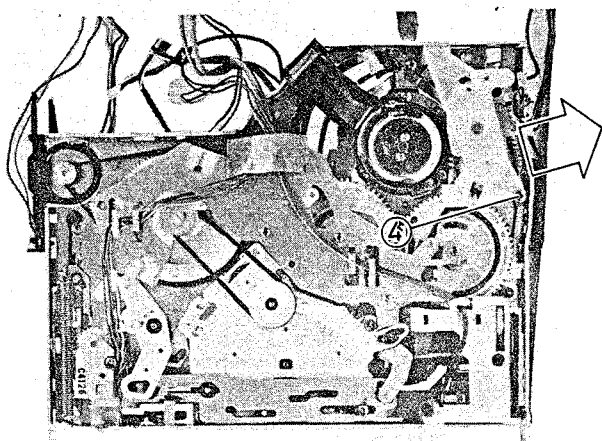


Fig. 2-78 Mechanism State Switch Removal

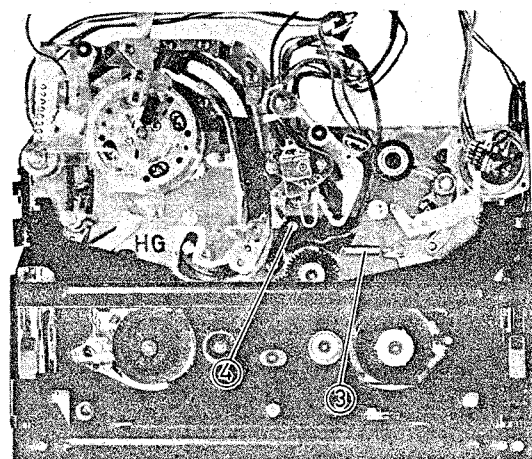


Fig. 2-81 End Lamp Removal

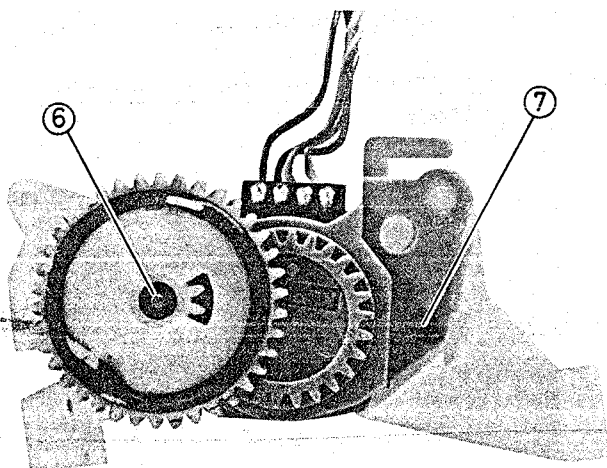


Fig. 2-79 Mechanism State Switch Removal

Lower Cylinder (Cylinder Motor) Removal (Figs. 2-82, 2-83)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Disconnect two (2) flat cables (CN613, CN214). (See Fig. 2-82)
3. Remove three (3) screws holding the lower cylinder and cylinder shield. (See Fig. 2-83)

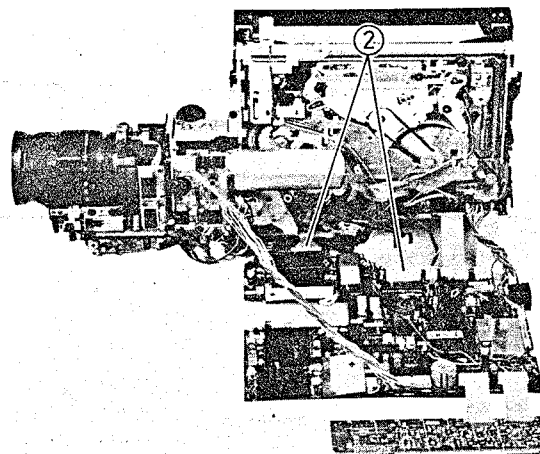


Fig. 2-82 Lower Cylinder (Cylinder Motor) Removal

End Lamp Removal (Figs. 2-80, 2-81)

1. Open the audio circuit board. (See Fig. 2-18)
2. Disconnect connector CN125. (See Fig. 2-80)
3. Remove the spring between the chassis and end lamp. (See Fig. 2-81)
4. Remove one (1) screw holding the end lamp.

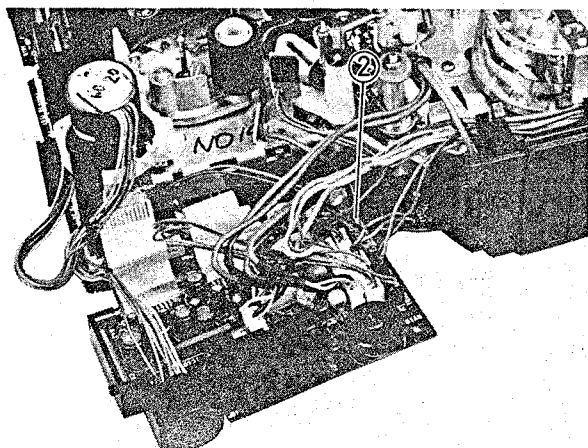


Fig. 2-80 End Lamp Removal

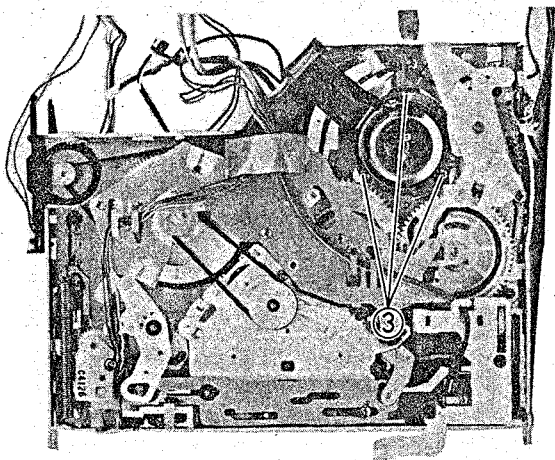


Fig. 2-83 Lower Cylinder (Cylinder Motor) Removal

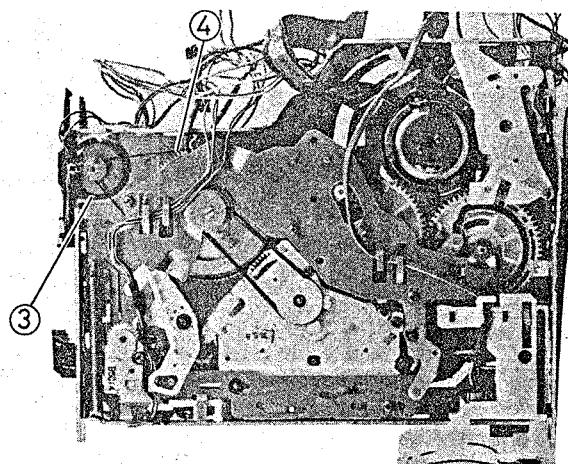


Fig. 2-85 Capstan Motor Removal

Capstan Motor Removal (Figs. 2-84, 2-85, 2-86, 2-87)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Disconnect connector CN612. (See Fig. 2-84)
3. Remove the belt cover. (See Fig. 2-85)
4. Remove the belt from the capstan motor pulley.
5. Lift the cassette holder. (See Fig. 2-48)
6. Remove two (2) screws holding the capstan motor holder. (See Fig. 2-86)
7. Remove two (2) screws holding the capstan motor. (See Fig. 2-87)

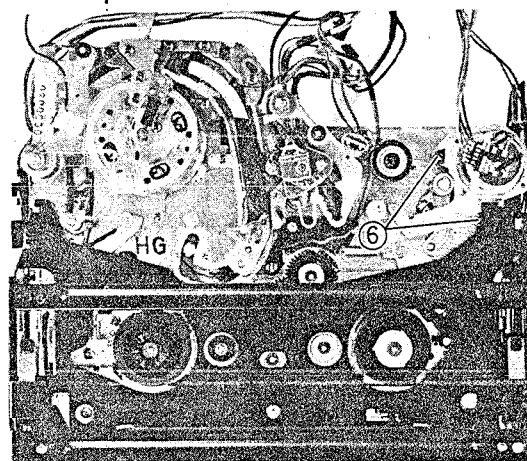


Fig. 2-86 Capstan Motor Removal

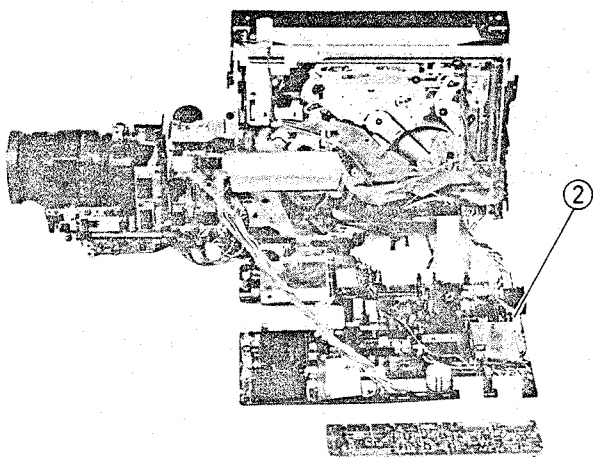


Fig. 2-84 Capstan Motor Removal

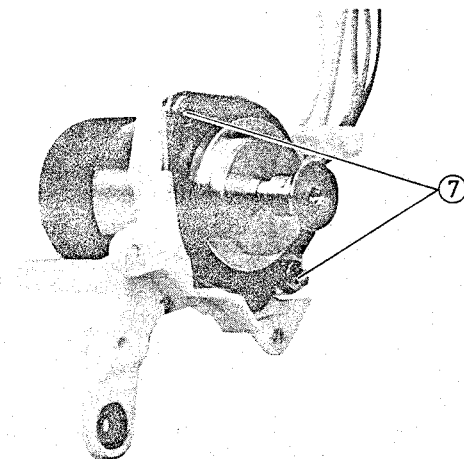


Fig. 2-87 Capstan Motor Removal

Loading Motor Removal (Figs. 2-88, 2-89, 2-90)

1. Open the audio circuit board. (See Fig. 2-18)
2. Disconnect connector CN118. (See Fig. 2-88)
3. Remove the wires from the wire holders. (See Fig. 2-89)
4. Remove three (3) screws holding the loading motor block.
5. Remove the belt of the loading motor. (See Fig. 2-90)
6. Remove two (2) screws holding the loading motor.

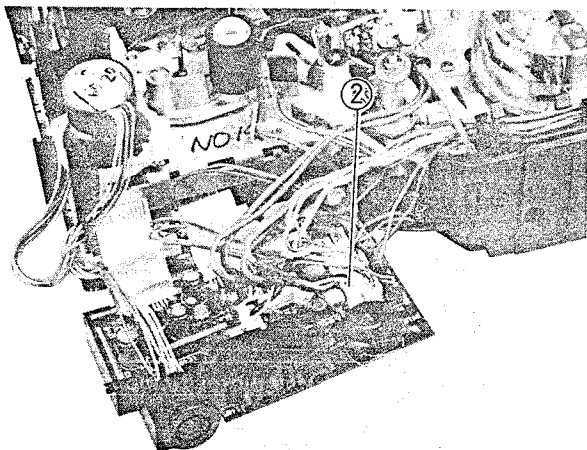


Fig. 2-88 Loading Motor Removal

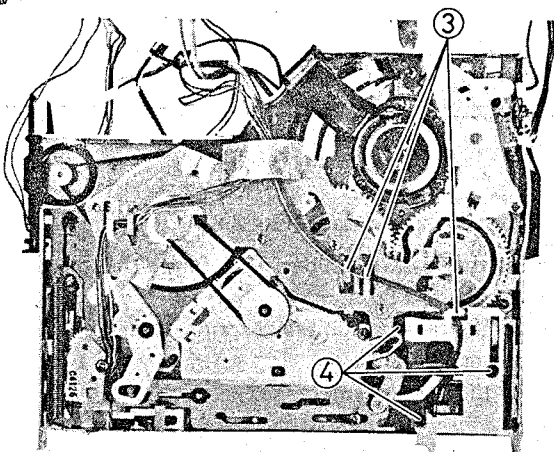


Fig. 2-89 Loading Motor Removal

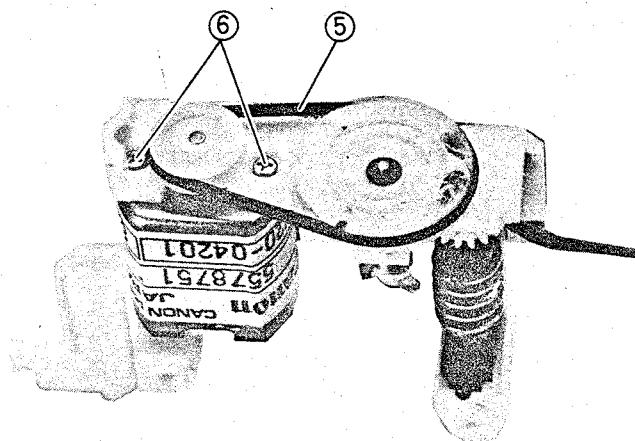


Fig. 2-90 Loading Motor Removal

Catcher Block Removal (Figs. 2-91, 2-92)

1. Remove one (1) screws holding the cylinder motor brush. (See Fig. 2-91)
2. Remove three (3) screws holding the cylinder assembly. (See Fig. 2-92)
3. Remove three (3) screws holding the catcher block.

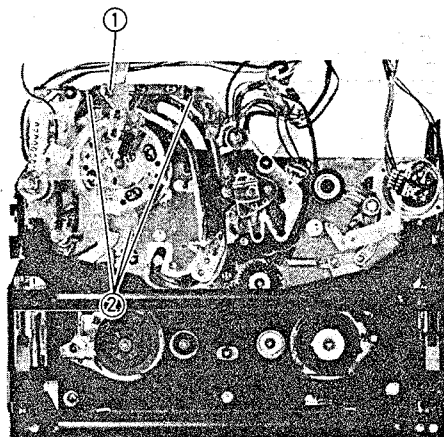


Fig. 2-91 Catcher Block Removal

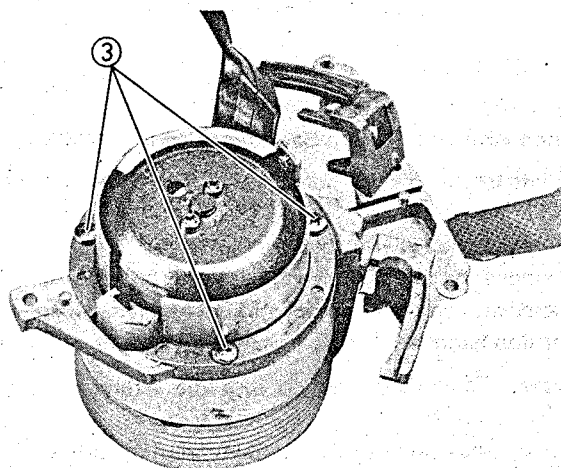


Fig. 2-92 Catcher Block Removal

Impedance Roller Removal (Fig. 2-93)

1. Remove the cylinder motor brush. (See Fig. 2-91)
2. Remove one (1) nut and pull out the impedance roller. (See Fig. 2-93)

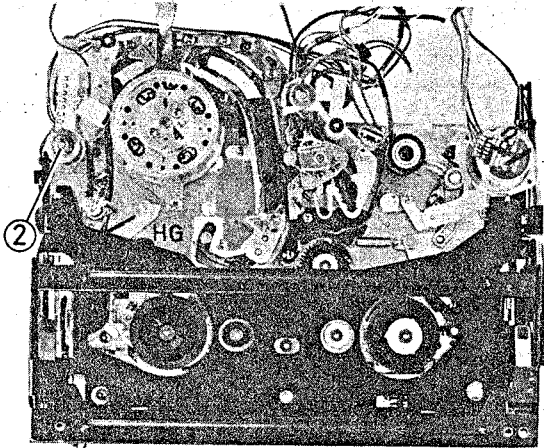


Fig. 2-93 Impedance Roller Removal

Pressure Roller Arm Removal (Fig. 2-94)

1. Remove the capstan motor holder. (See Fig. 2-86)
2. Pull out the pressure roller arm. (See Fig. 2-94)

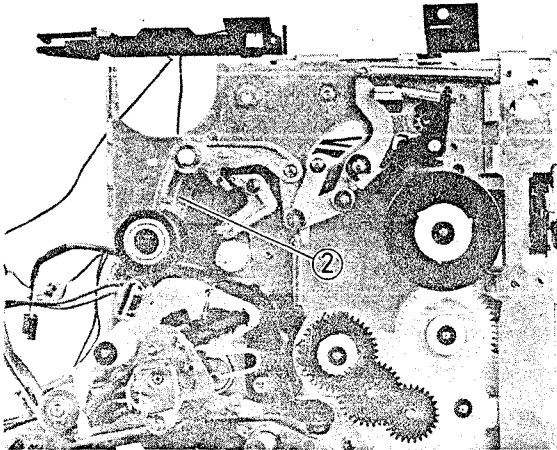


Fig. 2-94 Pressure Roller Removal

Tension Arm and Tension Band Removal (Figs. 2-95, 2-96)

1. Remove the cassette holder. (See Figs. 2-48, 2-49, 2-50, 2-51, 2-52)
2. Remove one (1) washer. (See Fig. 2-95)
3. Remove the tension spring (See Fig. 2-96)
4. Remove two (2) screws holding the tension arm and tension band.

Note: Take care not to lose the screws and spring holder when removing the screws. Because they may pop out due to the tension of spring.

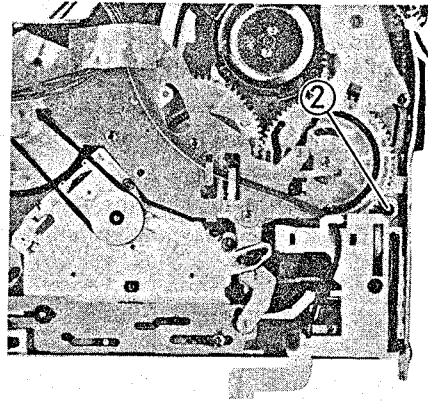


Fig. 2-95 Tension Arm and Tension Band Removal

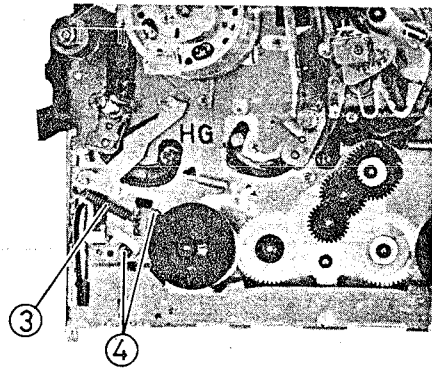


Fig. 2-96 Tension Arm and Tension Band Removal

Take-up Sub Brake Removal (Fig. 2-97)

1. Remove the cassette holder. (See Figs. 2-48, 2-49, 2-50, 2-51, 2-52)
2. Remove the take-up sub brake spring. (See Fig. 2-97)
3. Release one (1) tab.
4. Pull out the take-up sub brake.

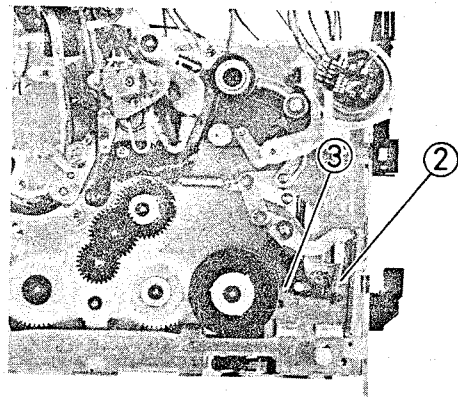


Fig. 2-97 Take-up Sub Brake Removal

Supply Sub Brake Removal (Fig. 2-98)

1. Remove the cassette holder. (See Figs. 2-48, 2-49, 2-50, 2-51, 2-52)
2. Remove the supply sub brake spring. (See Fig. 2-98)
3. Release one (1) tab.
4. Pull out the supply sub brake.

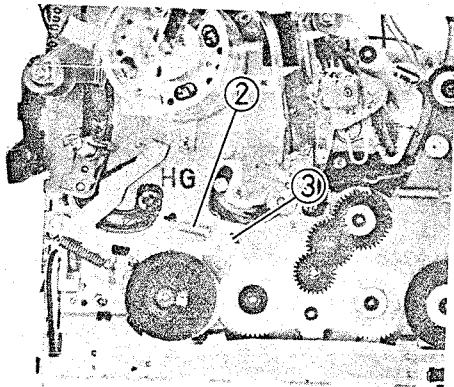


Fig. 2-98 Supply Sub Brake Removal

Take-up Reel Disk Removal (Fig. 2-99)

1. Remove the cassette holder. (See Figs. 2-48, 2-49, 2-50, 2-51, 2-52)
2. Remove one (1) washer and pull out the take-up reel disk. (See Fig. 2-99)

Note: Take care not to lose the washer in the lower section.

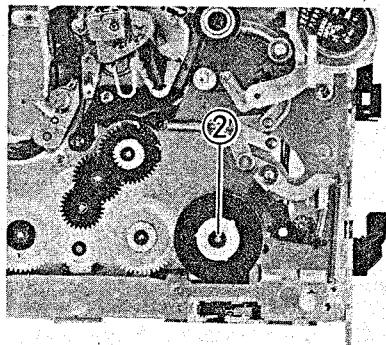


Fig. 2-99 Take-up Reel Disk Removal

Supply Reel Disk Removal (Fig. 2-100)

1. Remove the cassette holder. (See Fig. 2-48, 2-49, 2-50, 2-51, 2-52)
2. Remove the tension arm and tension band (See Figs. 2-95, 2-96)
3. Release the supply sub brake. (See Fig. 2-100)
4. Remove one (1) washer and pull out the supply reel table.

Note: Take care not to lose the washer in the lower section. Reinstall the supply reel disk by the reverse procedure to removal.

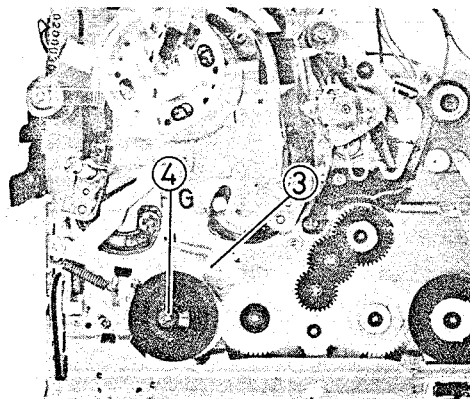


Fig. 2-100 Supply Reel Disk Removal

Guide Post (1) and Guide Post (2) Removal (Fig. 2-101)

1. Remove one (1) nut holding the guide post (1).
2. Remove one (1) nut holding the guide post (2):

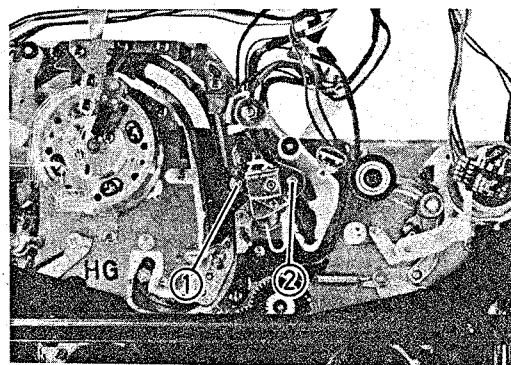


Fig. 2-101 Guide Post (1) and Guide Post (2) Removal

A/C Head Base Removal (Fig. 2-102)

1. Remove the A/C head. (See Figs. 2-55, 2-56, 2-57)
2. Remove one (1) nut, two (2) washers and one (1) bearing. (See Fig. 2-102)
3. Pull out the A/C head base.

Note: Reinstall the A/C head base so the A/C head height adjustment nut is positioned 2.5 to 3 mm below the point of the shaft.
After reinstalling, perform the following adjustments.

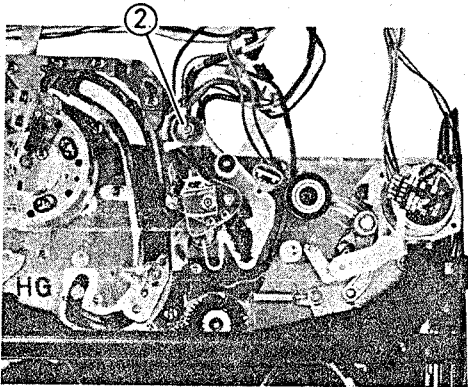


Fig. 2-102 A/C Head Base Removal

Supply Guide Roller and Take-up Guide Roller Removal (Fig. 2-104)

1. Remove one (1) hex screw holding the supply guide roller.
2. Remove the guide roller cap.
3. Remove one (1) hex screw holding the take-up guide roller.

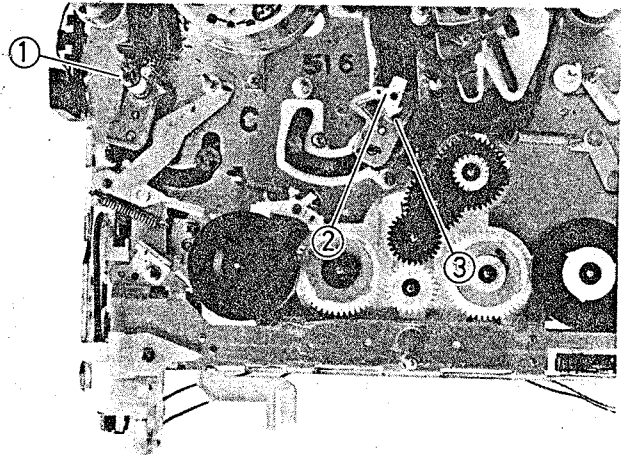


Fig. 2-104 Supply Guide Roller and Take-up Guide Roller Removal

Guide Arm Assembly Removal (Fig. 2-103)

1. Remove the A/C head. (See Figs. 2-55, 2-56, 2-57)
2. Remove the A/C head base. (See Fig. 2-102)
3. Remove one (1) washer and pull out the guide arm assembly. (See Fig. 2-103)

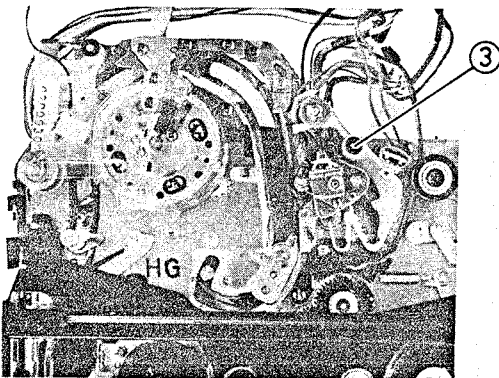


Fig. 2-103 Guide Arm Assembly Removal

Cam Gear Plate Removal (Fig. 2-105)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the wires from wire holders. (See Fig. 2-105)
3. Remove the belt cover.
4. Remove five (5) screws holding the cam gear plate.

Note: When reinstalling, tighten all the screws and then loose them by 3/4 turns.

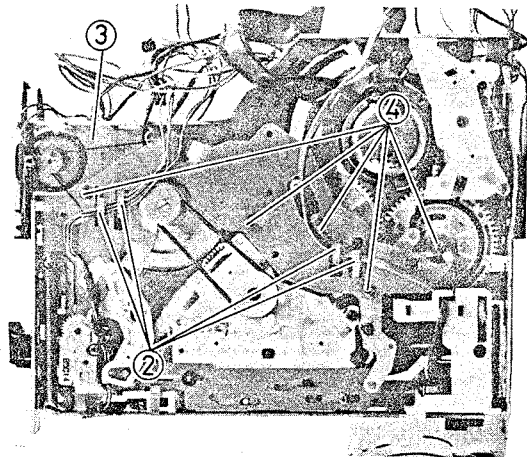


Fig. 2-105 Cam Gear Plate Removal

Capstan Flywheel Removal (Figs. 2-106, 2-107)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Remove two (2) belts from the capstan flywheel. (See Fig. 2-106)
4. Remove one (1) washer and pull out the capstan flywheel. (See Fig. 2-107)

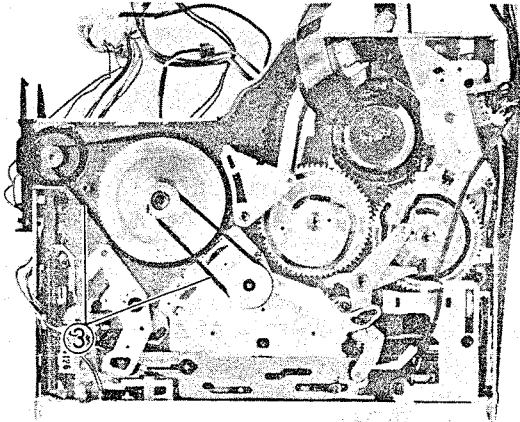


Fig. 2-106 Capstan Flywheel Removal

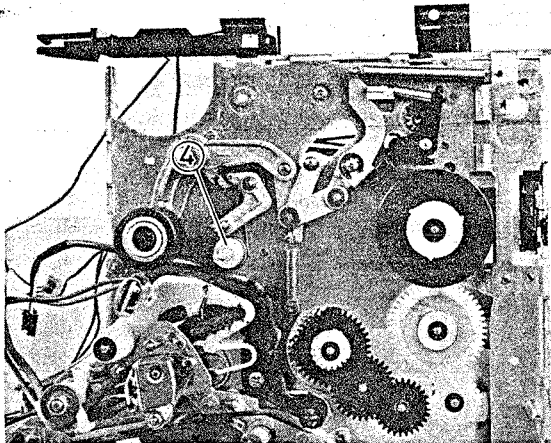


Fig. 2-107 Capstan Flywheel Removal

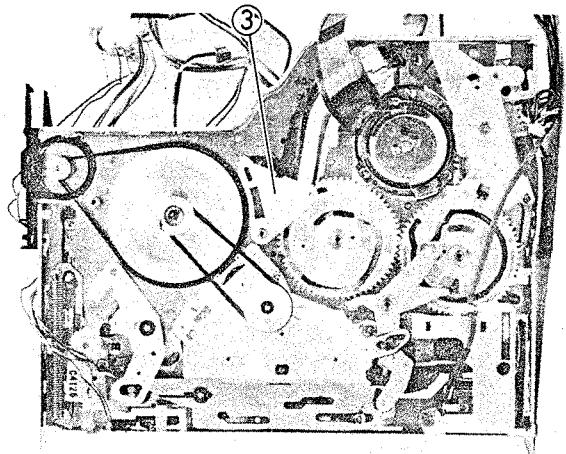


Fig. 2-108 A/C Head Control Arm Removal

PB/REC Drive Arm Removal (Fig. 2-109)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove one (1) washer and pull out the PB/REC drive arm. (See Fig. 2-109)

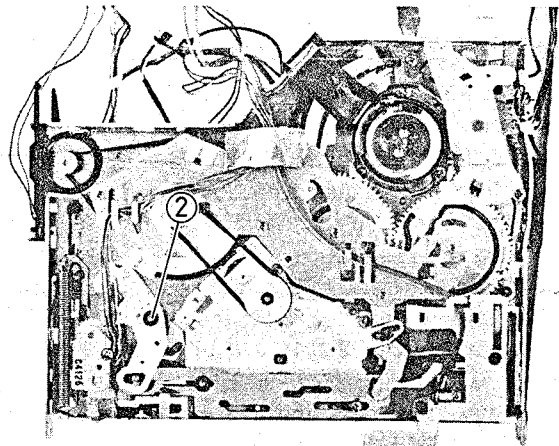


Fig. 2-109 PB/REC Drive Arm Removal

A/C Head Control Arm Removal (Fig. 2-108)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Pull out the A/C head control arm. (See Fig. 2-108)

Cam Gear Arm (1) and (2) Removal (Fig. 2-110)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Release one (1) tab and remove the idler drive arm.
4. Pull out the cam gear arm (1) and (2). (See Fig. 2-110)

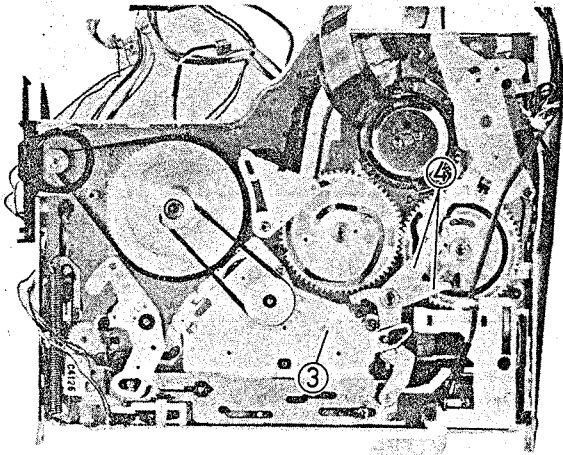


Fig. 2-110 Cam Gear Arm (1) and (2) Removal

Supply and Take-up Loading Cam Gears Removal (Fig. 2-111, 2-112)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the mechanism state switch holder. (See Figs. 2-77, 2-78, 2-79)
3. Remove the loading motor block. (See Fig. 2-89)
4. Remove the cam gear plate. (See Fig. 2-105)
5. Remove the A/C head control arm. (See Fig. 2-108)
6. Remove the cam gear arm (1) and (2). (See Fig. 2-110)
7. Turn the loading cam gear to set the guide roller to the loading state. (See Fig. 2-111)
8. Remove one (1) E ring. (See Fig. 2-112)
9. Remove two (2) E rings and pull out the loading cam gear. (See Fig. 2-111)

Note: After reinstalling the loading cam gears, adjust the mechanism state switch.

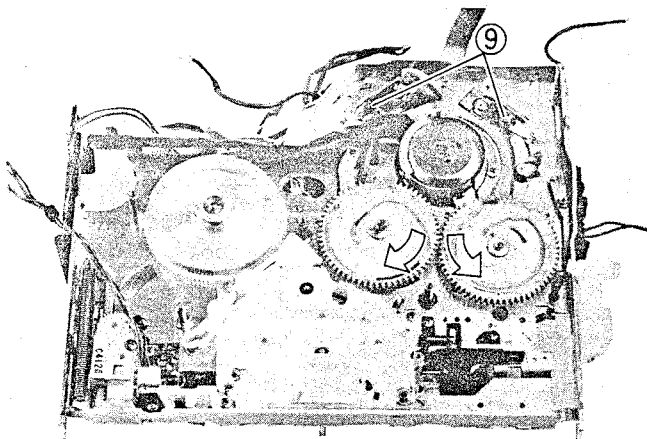


Fig. 2-111 Supply and Take-up Loading Cam Gears Removal

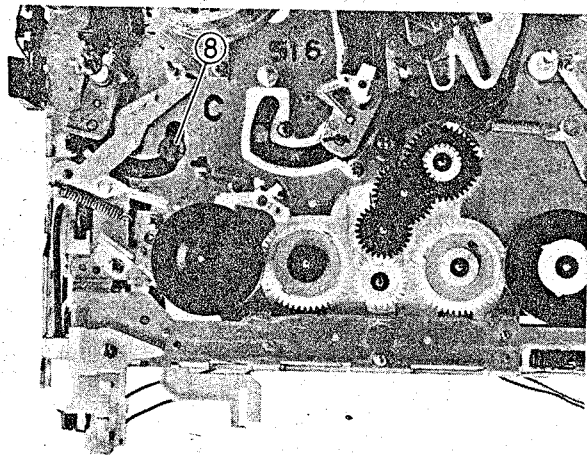


Fig. 2-112 Supply and Take-up Loading Cam Gears Removal

Guide Roller Base Removal (Fig. 2-113)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the loading motor block. (See Fig. 2-89)
3. Remove the mechanism state switch holder. (See Figs. 2-77, 2-78, 2-79)
4. Remove the cam gear plate. (See Fig. 2-105)
5. Remove the cam gear arm (1) and (2). (See Fig. 2-110)
6. Remove the loading cam gear. (See Fig. 2-111, 2-112)
7. Remove two (2) screws holding the limit plate and guide roller base. (See Fig. 2-113)

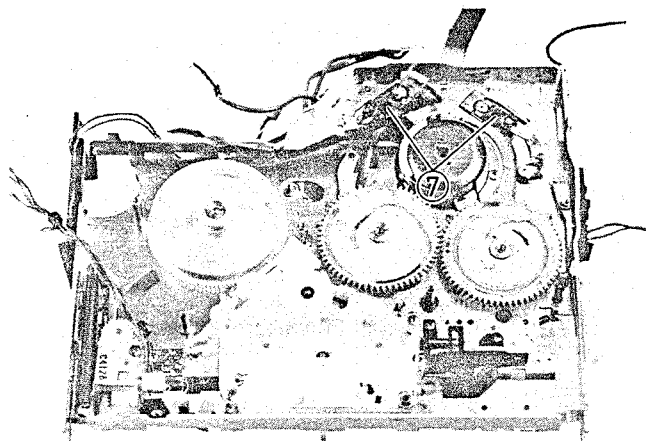


Fig. 2-113 Guide Roller Base Removal

Slider Removal (Fig. 2-114)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Remove the PB/REC drive arm. (See Fig. 2-109)
4. Remove the cam gear arm (1) and (2). (See Fig. 2-110)
5. Remove one (1) screw and one (1) washer holding the slider. (See Fig. 2-114)

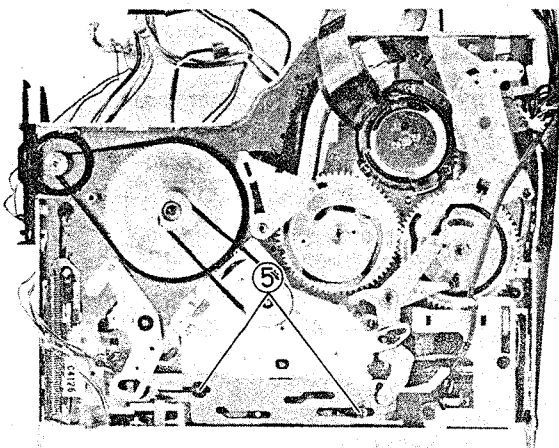


Fig. 2-114 Slider Removal

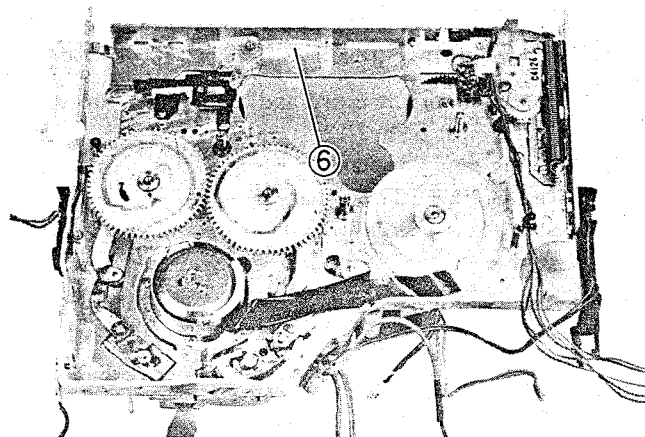


Fig. 2-116 Main Brake Arm Removal

Reel Gear Block Removal (Fig. 2-115)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Remove the PB/REC drive arm. (See Fig. 2-109)
4. Remove the cam gear arm (1) and (2). (See Fig. 2-109)
5. Remove the slider. (See Fig. 2-114)
6. Remove the belt from the reel gear block. (See Fig. 2-115)
7. Remove three (3) screws holding the reel gear block.

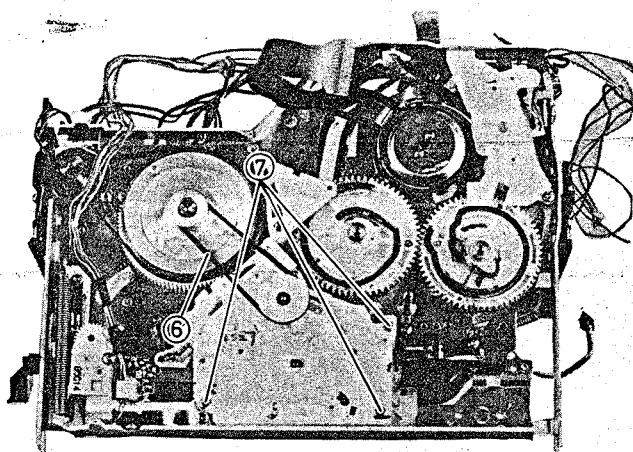


Fig. 2-115 Reel Gear Block Removal

Damper Removal (Fig. 2-117)

1. Open the main circuit board and function switch circuit board. (See Fig. 2-11, 2-12)
2. Remove one (1) screw holding the damper. (See Fig. 2-117)

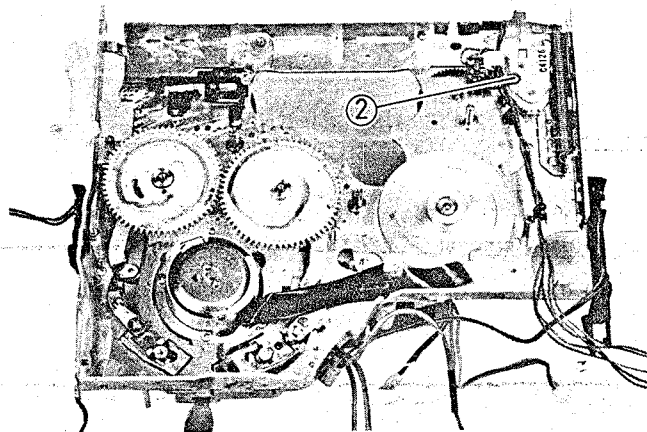


Fig. 2-117 Damper Removal

Main Brake Arm Removal (Fig. 2-116)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Remove the PB/REC drive arm. (See Fig. 2-109)
4. Remove the cam gear arm (1) and (2). (See Fig. 2-110)
5. Remove the slider. (See Fig. 2-114)
6. Remove the reel gear block. (See Fig. 2-115)
7. Pull out the main brake drive arm. (See Fig. 2-116)

Up Slider Removal (Fig. 2-118)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the cam gear plate. (See Fig. 2-105)
3. Remove the PB/REC drive arm. (See Fig. 2-109)
4. Remove the cam gear arm (1) and (2). (See Fig. 2-109)
5. Remove the slider. (See Fig. 2-114)
6. Remove the damper. (See Fig. 2-117)
7. Remove the up slider spring. (See Fig. 2-118)
8. Remove one (1) screw holding the lock holder.
9. Remove the up slider in the direction of the arrow.

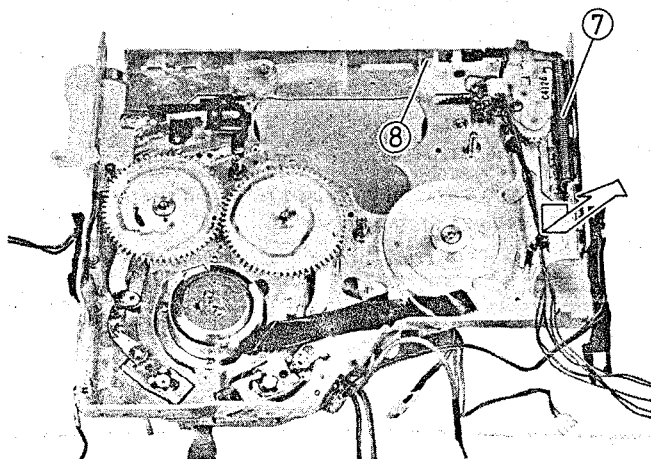


Fig. 2-118 Up Slider Removal

Quick Slider Removal (Fig. 2-119)

1. Open the main circuit board and function switch circuit board. (See Figs. 2-11, 2-12)
2. Remove the loading motor block. (See Figs. 2-88, 2-89)
3. Remove the cam gear plate. (See Fig. 2-105)
4. Remove the PB/REC drive arm. (See Fig. 2-109)
5. Remove the cam gear arm (1) and (2). (See Fig. 2-110)
6. Remove two (2) screws holding the quick slider. (See Fig. 2-119)

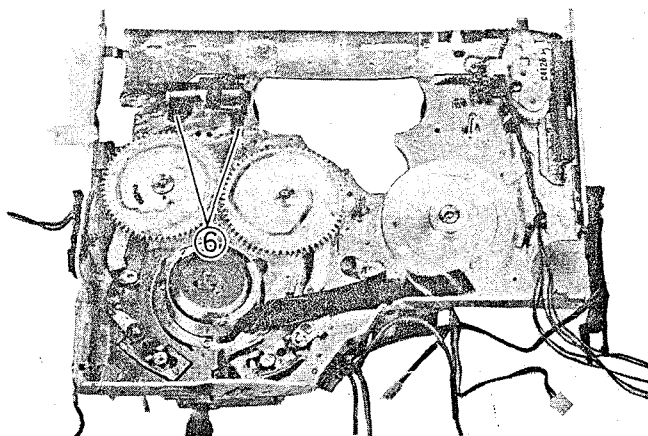


Fig. 2-119 Quick Slider Removal

Saticon Removal (Figs. 2-120, 2-121, 2-122)

1. Remove the camera switch circuit board. (See Figs. 2-29, 2-30, 2-31)
2. Remove the preamp circuit board. (See Figs. 2-33, 2-34, 2-35, 2-36, 2-37, 2-38)
3. Strip the saticon shield. (See Fig. 2-120)
4. Disconnect saticon socket. (See Fig. 2-121)
5. Remove four (4) screws holding the saticon cover.
6. Release four (4) tabs and remove the bias light. (See Fig. 2-122)

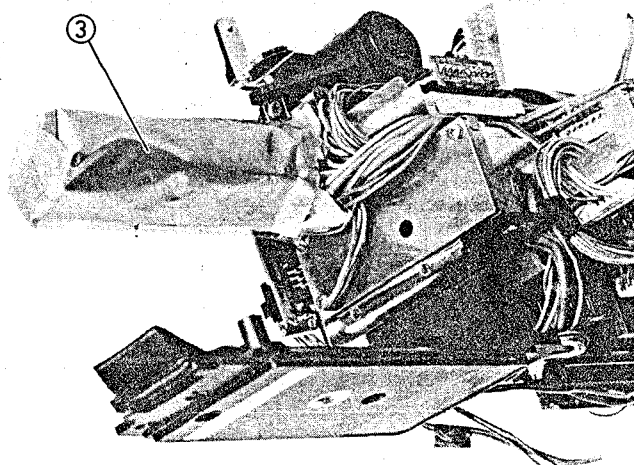


Fig. 2-120 Saticon Removal

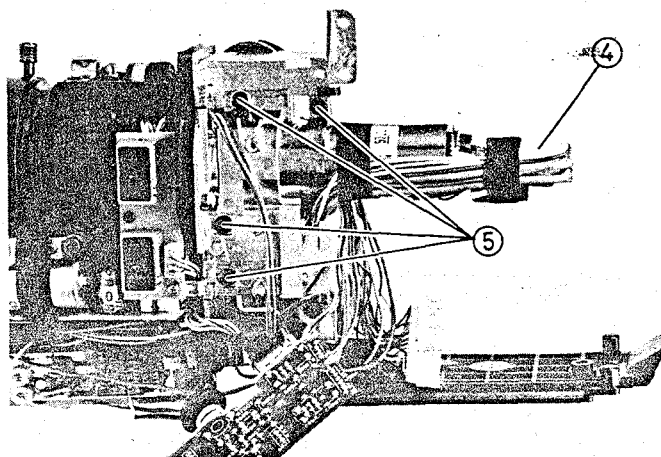


Fig. 2-121 Saticon Removal

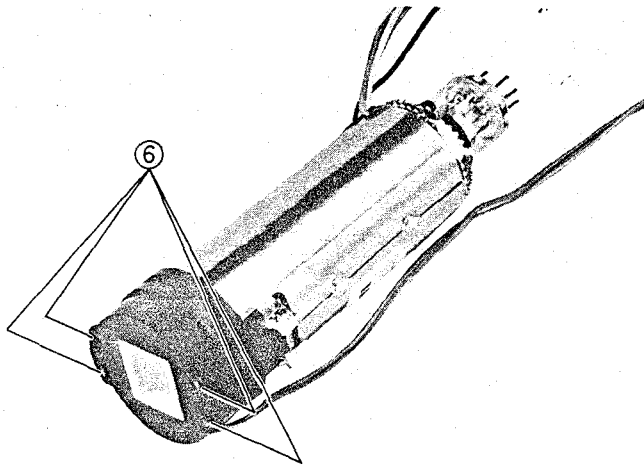


Fig. 2-122 Saticon Removal

LENS BLOCK

Lens Block Removal

(Figs. 2-123, 2-124, 2-125, 2-126, 2-127, 2-128)

1. Disconnect CN1018. (See Fig. 2-123)
2. Open the regulator circuit board. (See Fig. 2-24)
3. Disconnect two (2) connectors (CN1508, CN1524). (See Fig. 2-124)
4. Remove the camera switch circuit board. (See Figs. 2-29, 2-30, 2-31)
5. Remove the EVF connector. (See Figs. 2-39, 2-40, 2-41)
6. Remove three (3) screws holding the lens block. (See Figs. 2-126, 2-127, 2-128)

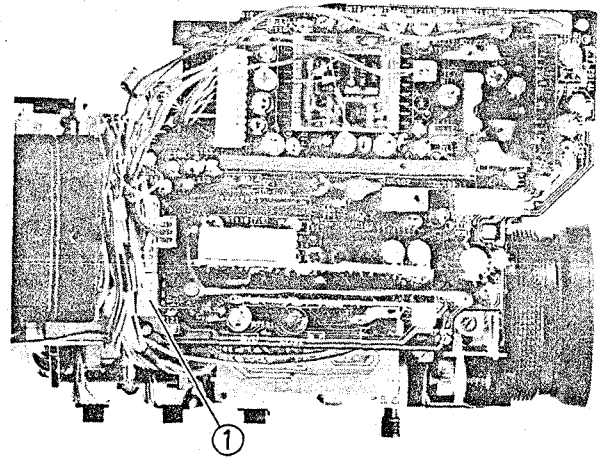


Fig. 2-123 Lens Block Removal

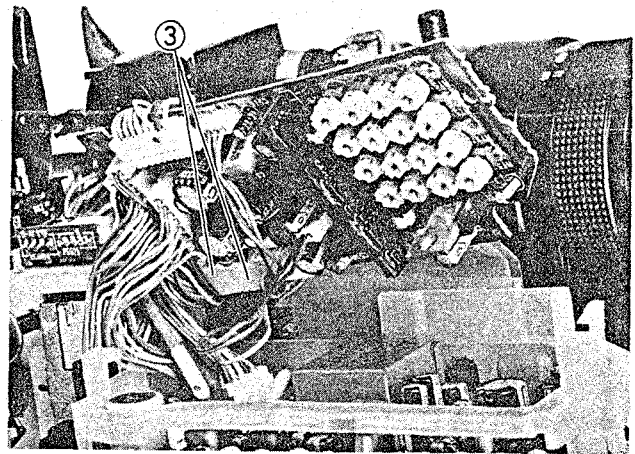


Fig. 2-124 Lens Block Removal

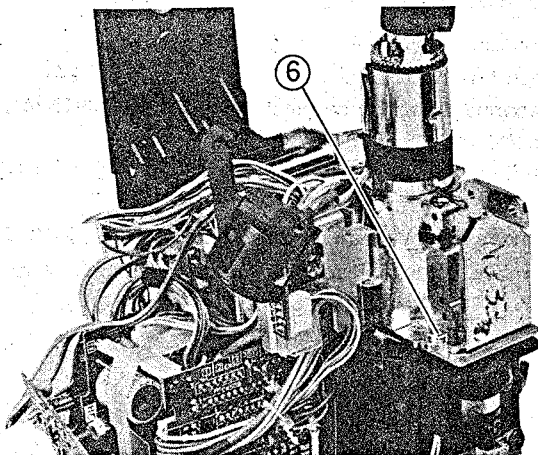


Fig. 2-125 Lens Block Removal

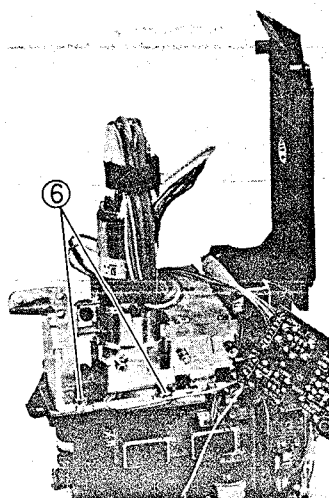


Fig. 2-126 Lens Block Removal

Auto Focus Circuit Board Removal (Figs. 2-127, 2-128, 2-129)

1. Remove the lens block as previously given.
2. Unsolder two (2) points and remove the auto focus circuit board shield cover. (See Fig. 2-127)
3. Remove two (2) screws holding the auto focus circuit board. (See Fig. 2-128)
4. Open the auto focus circuit board.
5. Disconnect four (4) connectors (CN1, CN2, CN3, CN4). (See Fig. 2-129)

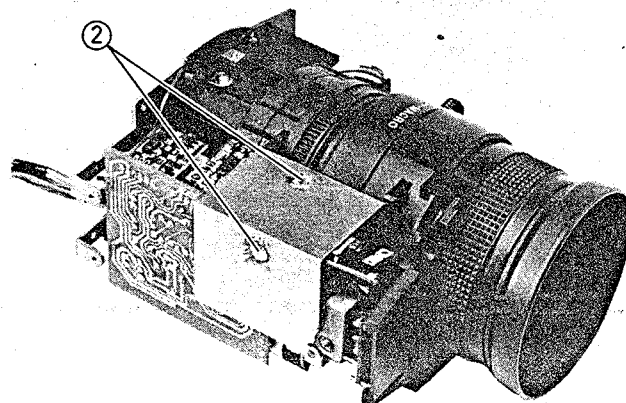


Fig. 2-127 Auto Focus Circuit Board Removal

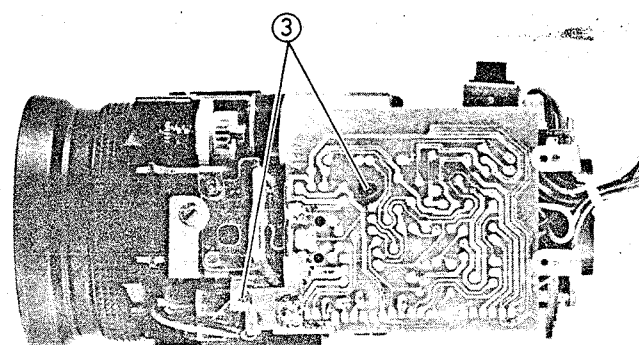


Fig. 2-128 Auto Focus Circuit Board Removal

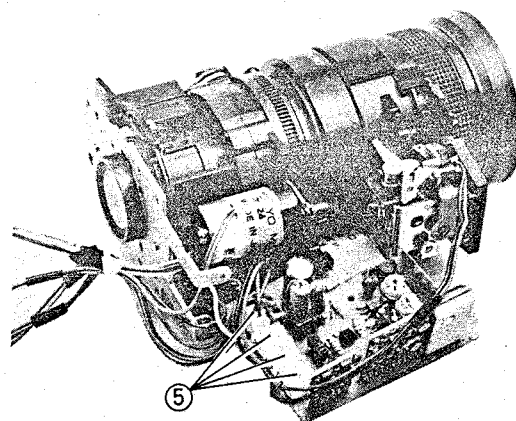


Fig. 2-129 Auto Focus Circuit Board Removal

Focus Switch Circuit Board Removal (Fig. 2-130)

1. Remove the lens block as previously given.
2. Disconnect connector CN4. (See Fig. 2-130)
3. Remove three (3) screws holding the focus switch circuit board.

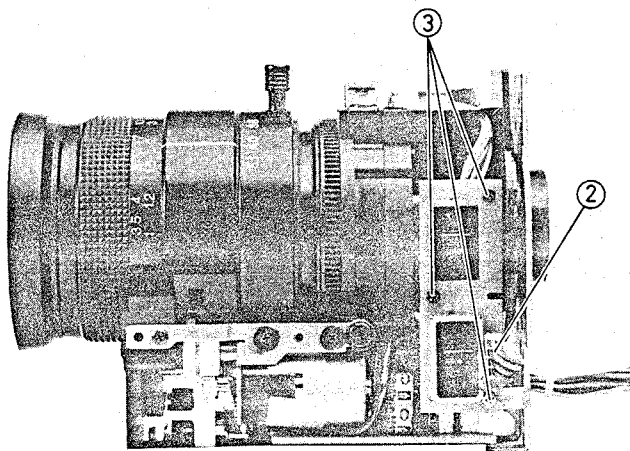


Fig. 2-130 Focus Switch Circuit Board Removal

Iris Block Removal (Figs. 2-131, 2-132)

1. Remove the lens block as previously given.
2. Remove the auto focus circuit board. (See Figs. 2-127, 2-128, 2-129)
3. Remove the focus switch circuit board. (See Fig. 2-130)
4. Remove four (4) screws holding the relay lens block, and remove it. (See Fig. 2-131)
5. Remove three (3) screws holding the iris block, and remove it. (See Fig. 2-132)

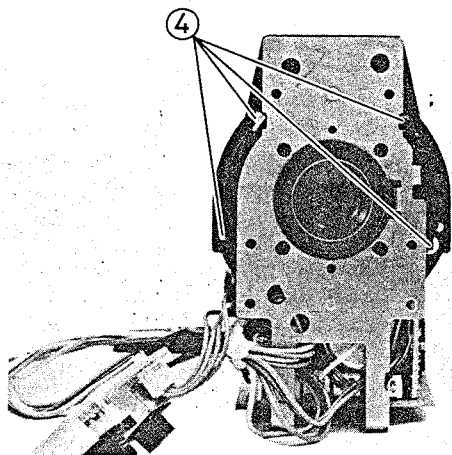


Fig. 2-131 Iris Block Removal

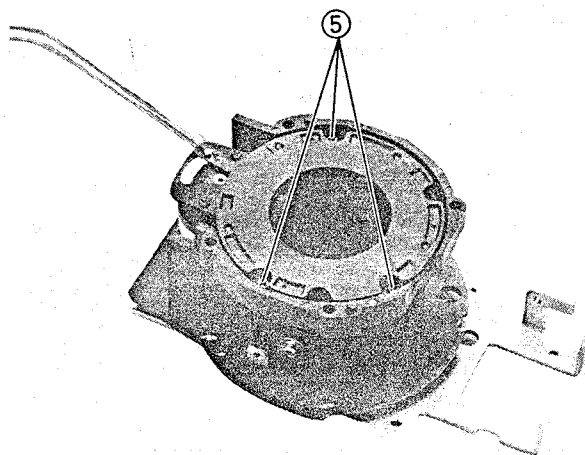


Fig. 2-132 Iris Block Removal

Zoom Motor Removal (Fig. 2-133)

1. Remove the lens block as previously given.
2. Open the auto focus circuit board. (See Fig. 2-128)
3. Remove two (2) screws holding the zoom motor. (See Fig. 2-133)

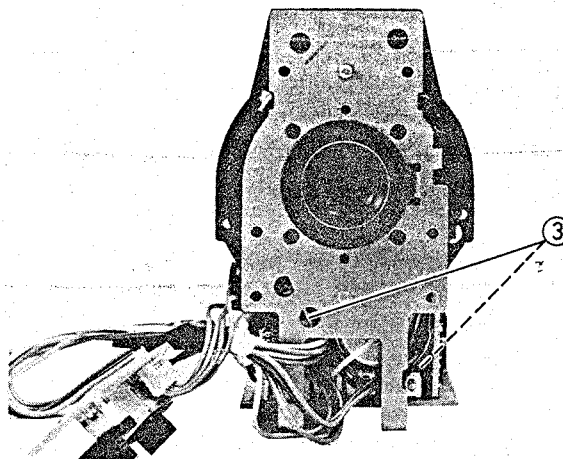


Fig. 2-133 Zoom Motor Removal

ELECTRONIC VIEWFINDER (EVF)

Remove the electronic viewfinder (EVF) as previously given.

Bottom Cover Removal (Fig. 2-138)

1. Turn the microphone ring in the direction of the arrow. (See Fig. 2-138)
2. Remove five (5) screws holding the bottom cover.

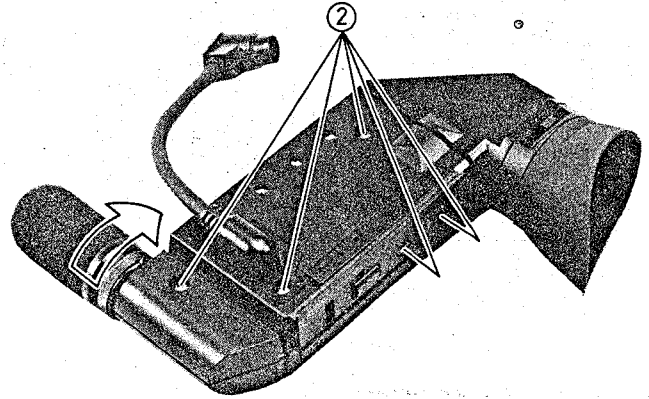


Fig. 2-138 Bottom Cover Removal

Electronic Viewfinder (EVF) Circuit Board Removal (Figs. 2-139, 2-140)

1. Remove the bottom cover. (See Fig. 2-138)
2. Pull out the electronic viewfinder (EVF) circuit board, CRT and mic jack circuit board in the direction of the arrow. (See Fig. 2-139)
3. Disconnect two (2) connectors (CN822, CN003). (See Fig. 2-140)

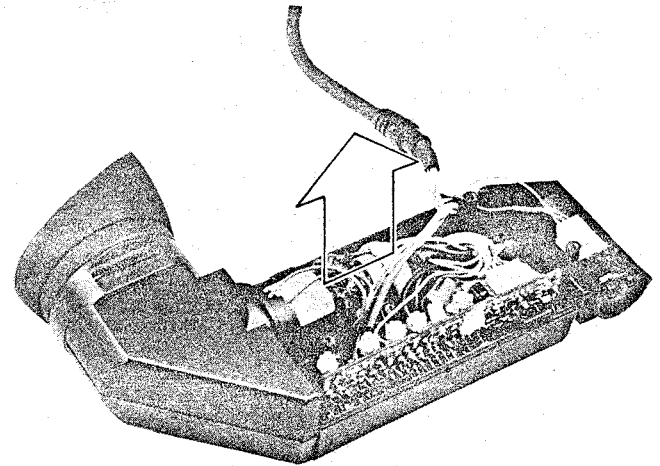


Fig. 2-139 Electronic Viewfinder (EVF) Circuit Board

Auto Focus Motor Removal (Figs. 2-134, 2-135)

1. Remove the lens block as previously given.
2. Open the auto focus circuit board. (See Fig. 2-128)
3. Disconnect connector CN2. (See Fig. 2-134)
4. Remove two (2) screws holding the auto focus motor. (See Fig. 2-135)

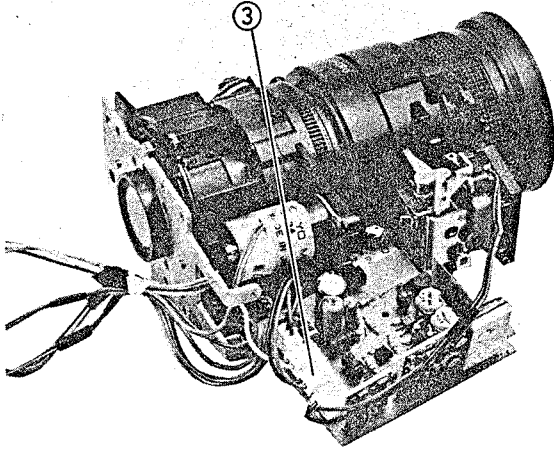


Fig. 2-134 Auto Focus Motor Removal

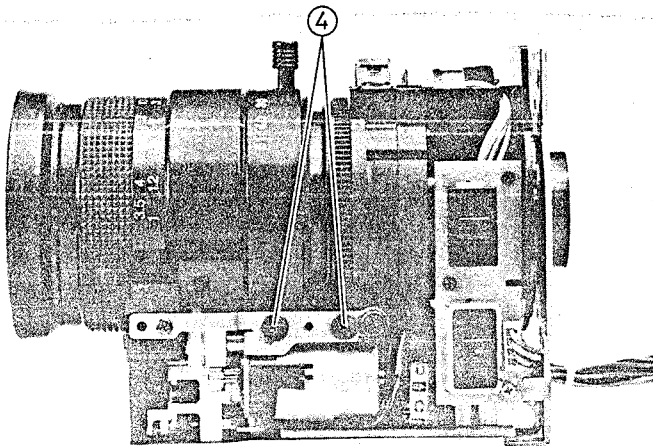


Fig. 2-135 Auto Focus Motor Removal

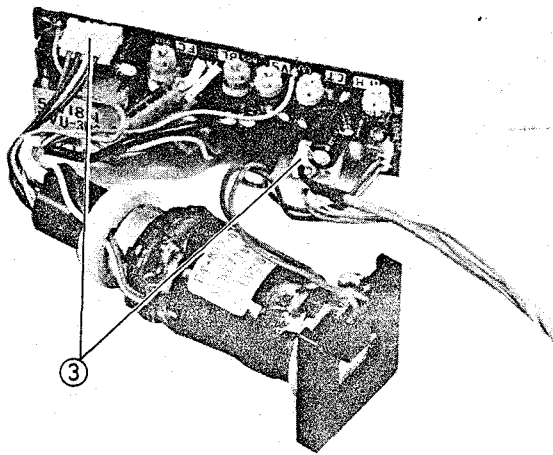


Fig. 2-140 Electronic Viewfinder (EVF) Circuit Board Removal

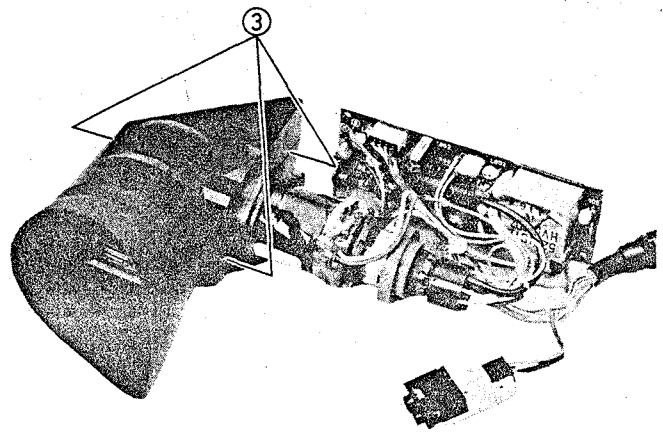


Fig. 2-142 CRT Removal

Mic Jack Circuit Board Removal (Fig. 2-141)

1. Remove the bottom cover. (See Fig. 2-138)
2. Disconnect connector CN023. (See Fig. 2-141)

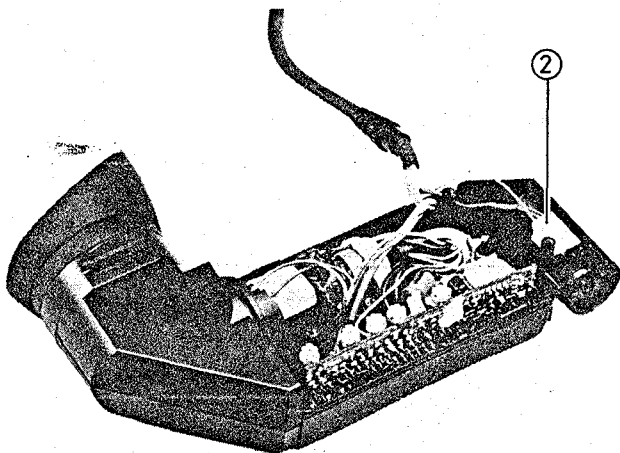


Fig. 2-141 Mic Jack Circuit Board Removal

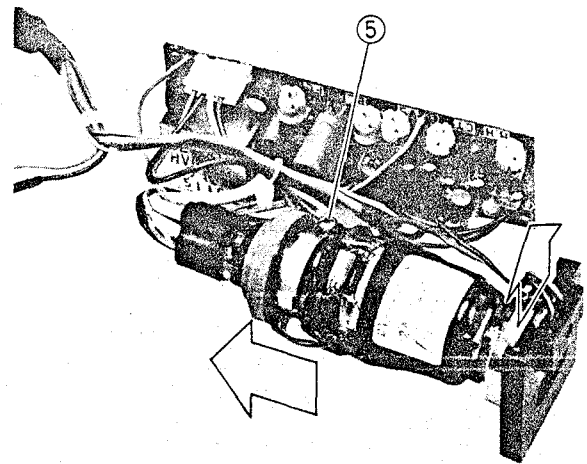
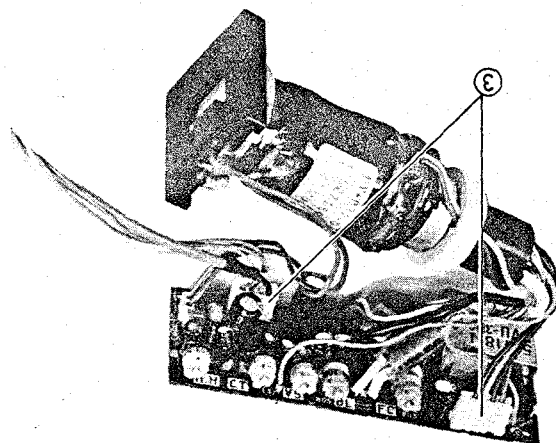


Fig. 2-143 CRT Removal

CRT Removal (Figs. 2-142, 2-143)

1. Remove the bottom cover. (See Fig. 2-138)
2. Remove the EVF circuit board. (See Figs. 2-139, 2-140)
3. Press the CRT top cover to release the locking tabs and CRT top cover. (See Fig. 2-142)
4. Remove one (1) screw holding the deflection coil.
(See Fig. 2-143)
5. Remove the deflection coil in the direction of the arrow.
6. Remove the CRT frame in the direction of the arrow.

Fig. 2-140 Electronic Viewfinder (EVF) Circuit Board Removal



1. Remove the bottom cover. (See Fig. 2-138)
2. Disconnect connector CN023. (See Fig. 2-141)

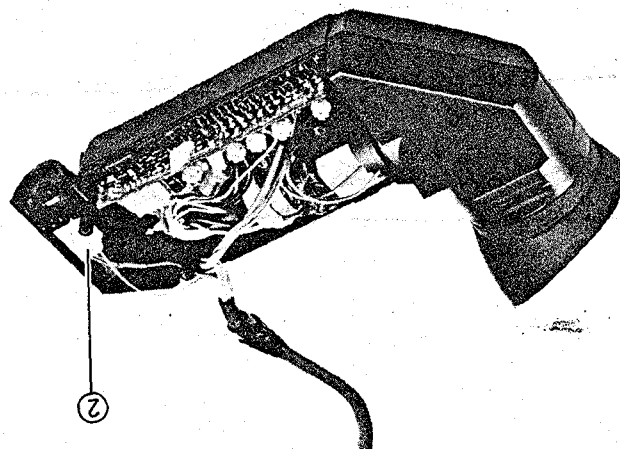


Fig. 2-141 Mic Jack Circuit Board Removal

CRT Removal (Figs. 2-142, 2-143)

1. Remove the bottom cover. (See Fig. 2-138)
2. Remove the EVF circuit board. (See Figs. 2-139, 2-140)
3. Press the CRT top cover to release the locking tabs and CRT top cover. (See Fig. 2-142)
4. Remove one (1) screw holding the deflection coil. (See Fig. 2-143)
5. Remove the deflection coil in the direction of the arrow.
6. Remove the CRT frame in the direction of the arrow.

Fig. 2-142 CRT Removal

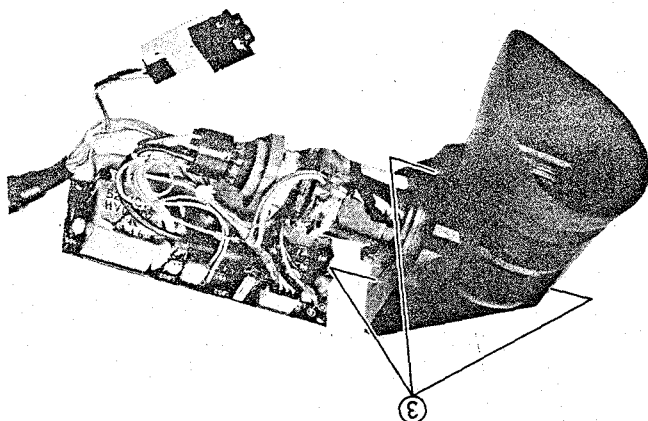
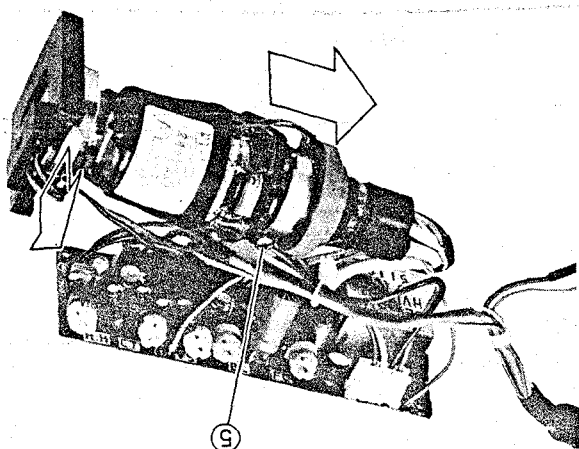


Fig. 2-143 CRT Removal



- (K) Bundle the wires of CN1005 and CN1525 with a bead band.
- (L) Pass the wires of CN1501, CN1005, CN1607, CN1011, CN1012 and CN1013 under the heat sink of the 8V regulator circuit board.

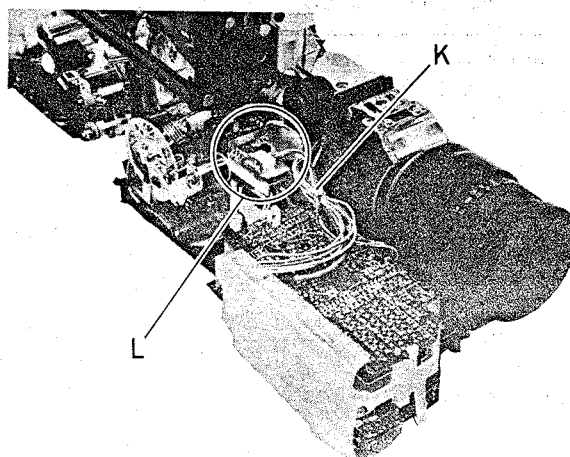


Fig. 2-204

- (M) Fix the wires of CN1012 and CN1013 and the capacitor for the Saticon using cloth tape at the positions shown in Fig. 2-205.

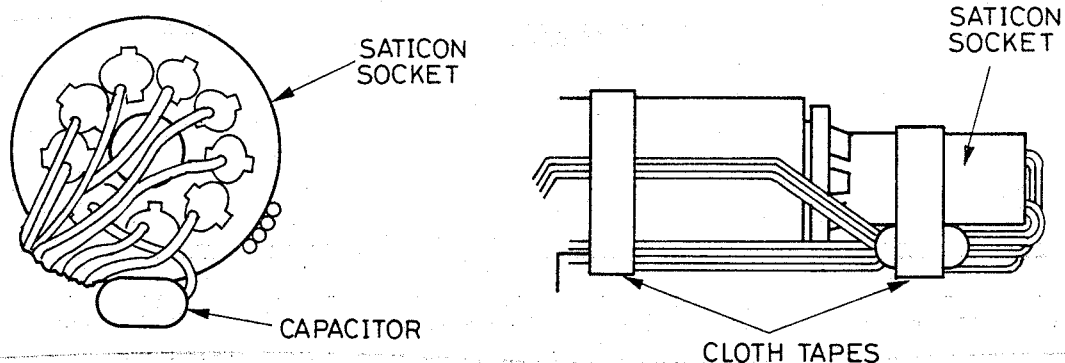
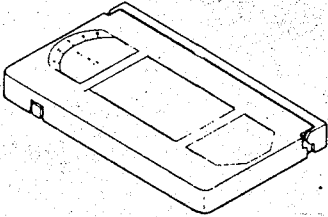
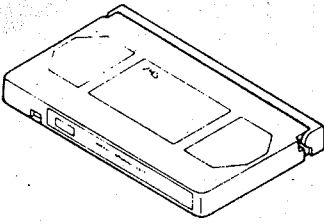
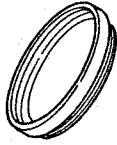
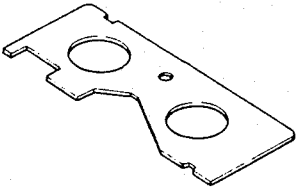
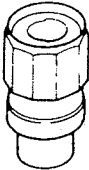
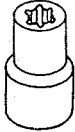
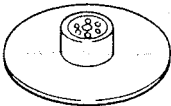
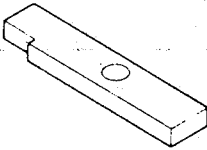
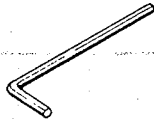
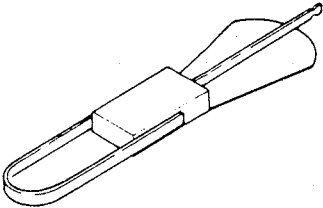
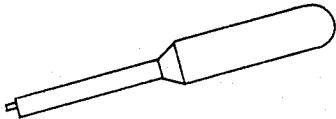
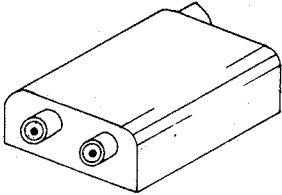
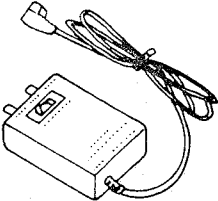
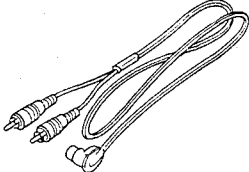


Fig. 2-205

ADJUSTMENT

SERVICING JIGS AND TOOLS

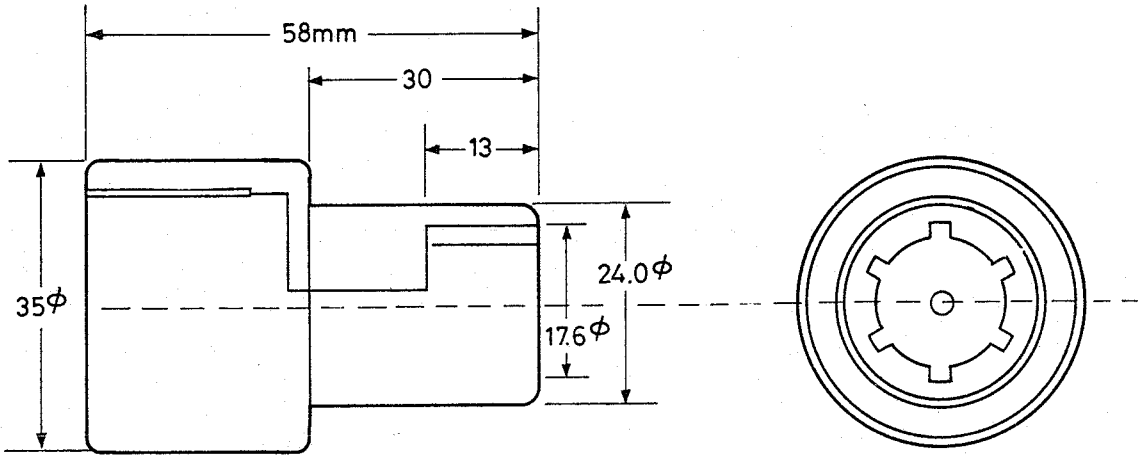
1. Back Tension Meter Parts No. 7099004 	2. Alignment Tape Parts No. 7099052 	3. Light Balancing Filter Parts No. 7099207 
4. Master Plane Parts No. 7099041 	5. Torque Gauge Parts No. 7099039 	6. Torque Gauge Adapter Parts No. 7099204 
7. Dummy Reel Parts No. 7099043 	8. Reel Disk Height Jig Parts No. 7099038 	9. 0.9 mm Hexagonal Wrench 
10. Fan Type Tension Gauge 	11. Back Focus Adjustment Driver Parts No. 7099205 	12. AV Input Adapter VM-CH20E 
13. RF Converter Unit VM-RF20E VM-RF20E(AU) 	14. AV Output Cable VM-CH25E 	

Service Parts

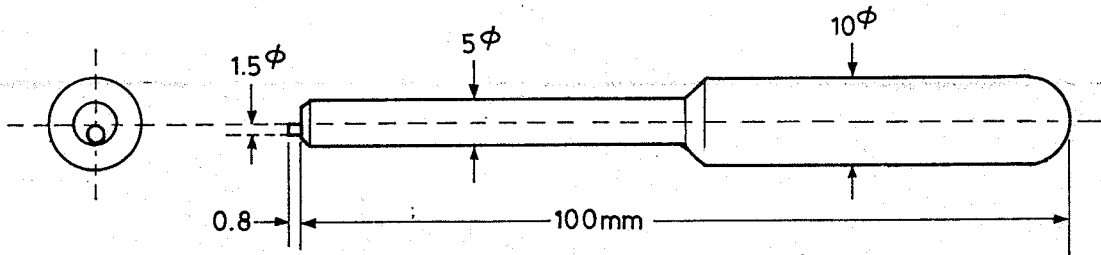
No.	MODEL	PARTS No.
12	VM-CH20E	5659991
	VM-RF20E	7095221
13	„ (AU)	7095201
14	VM-CH25E	5855332

NEW SERVICE JIG AND TOOLS SPECIFICATIONS

PARTS NO.	DESCRIPTION	MODEL
7099204	TORQUE GAUGE ADAPTOR	VM-200E



PARTS NO.	DESCRIPTION	MODEL
7099205	BACKFOCUS ADJUSTMENT DRIVER	VM-200E



MECHANICAL ADJUSTMENT

1. MECHANISM STATE SWITCH ADJUSTMENT

Loading Cam Gear (Supply/Take-up) Adjustment (Fig. 3-1)

Be sure to perform this adjustment after replacing the Loading Cam Gear (Supply/Take-up), before adjusting the Mechanism State Switch.

1. Check that marking (1) on the supply loading cam gear and the marking on the take-up loading cam gear aligned. If they are not aligned, reassemble the loading cam gears.

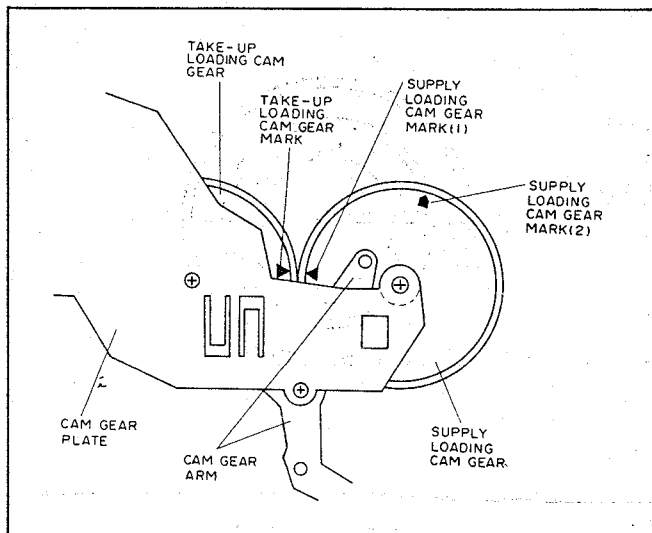


Fig. 3-1 Loading Cam Gear (Supply/Take-up) Adjustment

Mechanism State Switch Adjustment (Fig. 3-2)

Be sure to perform this adjustment after replacing the mechanism state switch and loading cam gears (supply/take-up).

1. Assemble the mechanism state switch and cam gear T so marking (1) on the mechanism state switch and marking (1) on cam gear T are aligned. (See Fig. 3-2(A))
2. Turn cam gear T in the direction of the arrow so that marking (1) on the mechanism state switch and marking (1) on the switch holder are aligned. (See Fig. 3-2 (B))
3. Check that the loading cam gear adjustment is performed correctly.
4. Assemble the mechanism state switch holder into the chassis so that marking (2) on cam gear T and marking (2) on the supply loading cam gear are aligned. Check that marking (2) on the mechanism state switch and marking (2) on the switch holder are aligned at this time. (See Fig. 3-2 (C)) If they are not aligned, readjust the mechanism state switch.

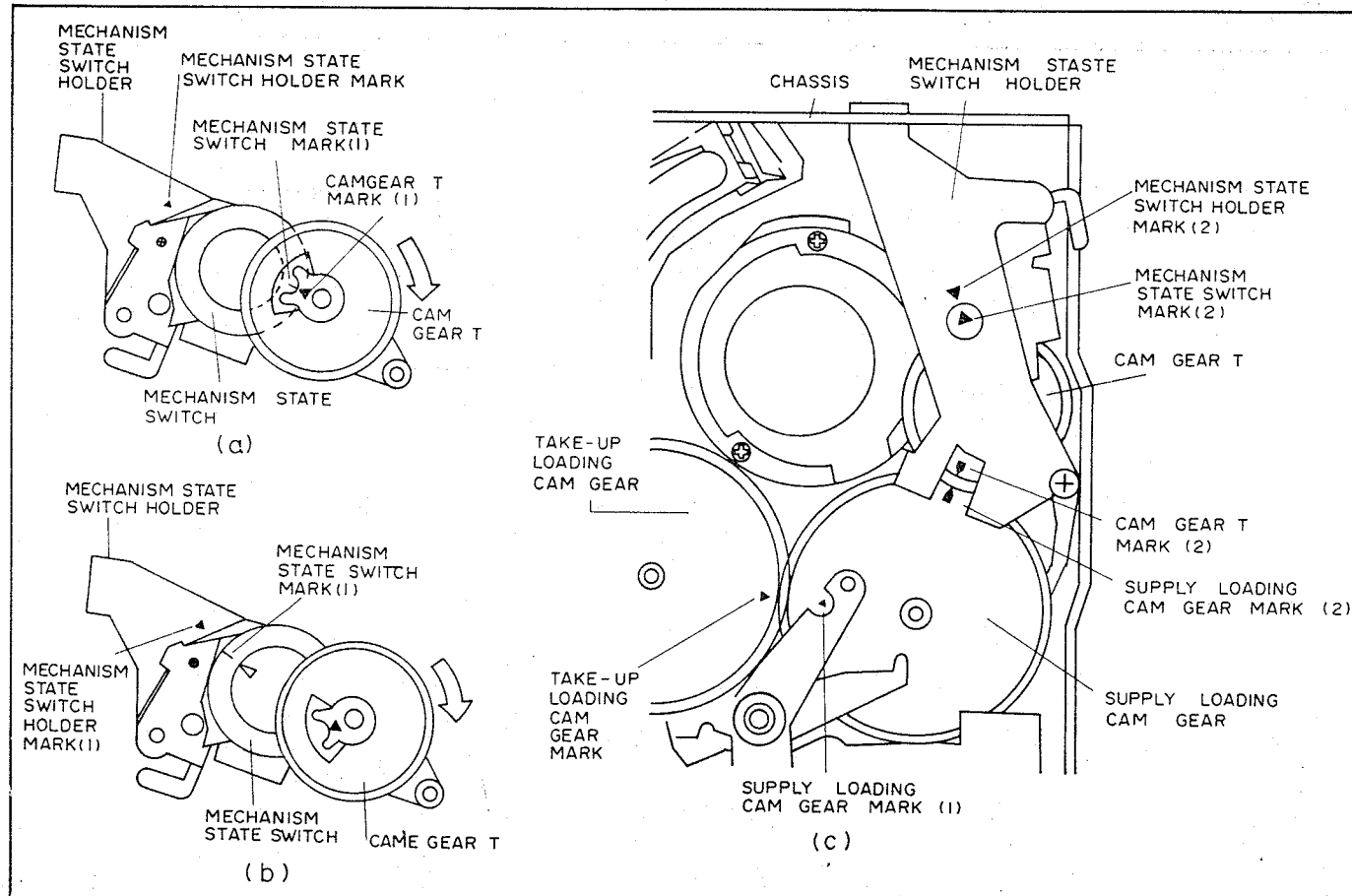


Fig. 3-2 Mechanism State Switch Adjustment

2. TAPE TRANSPORT SYSTEM COMPONENTS CHECK/ADJUSTMENT

The tape transport system is the part from the supply reel to the take-up reel via the video head.

The tape transport components, especially the components which came into direct contact with the tape should be kept clean without damage, dust and oil, etc. adhering to the contact surfaces. The tape transport system is adjusted before shipment from the factory, so when any transport components are replaced, the transport system is stabilized by correctly adjusting the new components.

Reel Disk Height Adjustment (Fig. 3-3)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the reel disk.
3. Check that the top of the reel disk is positioned between section A and B of the reel disk height jig.
4. When the top of the reel disk is positioned between section A and B, adjust the number of the spacers (3 types: 0.13 mm, 0.25 mm and 0.5 mm in thick) at the bottom of the reel disk.

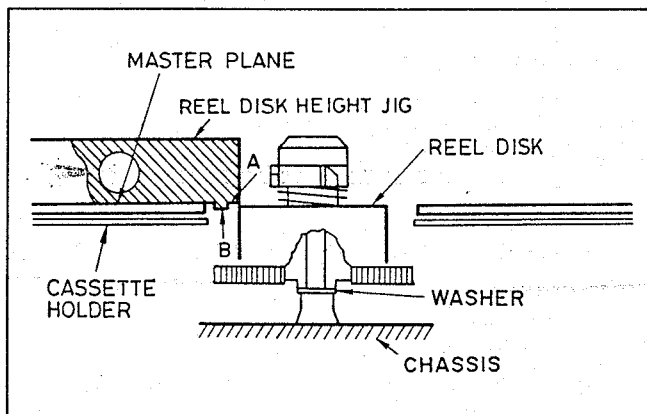


Fig. 3-3 Reel Disk Height Adjustment

Tension Pole Position/Tension Adjustment

Position Adjustment (Fig. 3-4)

1. Set the tension spring to position "B" on the spring holder.
2. Cover up the supply tape-sensor photocell located midway on the left side of the tape mechanism.
3. Place instrument in the "play" mode.
4. After loading is complete, loosen the screw holding the tension band holder. Then, slide the holder and adjust so that the clearance between section A of the supply end sensor holder and the tension arm is 0.6 to 1.2mm.
5. Tighten screw to secure adjustment.

Tension Adjustment (Fig. 3-4)

1. Load the instrument with the back tension adjustment tape.
2. Place the instrument in the "play" mode.
3. Read the scale on the supply reel.
4. This reading should be between 27 and 38.
5. Move the tension arm spring to the position "A" on the spring holder when the tension adjustment tape reads 39 or higher, and to the position "C" on the spring holder when it is 26 or lower, and adjust the back tension for a nominal reading of 27-38 on the scale.
6. Recheck the tension arm position when the back tension is changed greatly (5 or more).

Note: The instrument must be in a horizontal position for this adjustment.

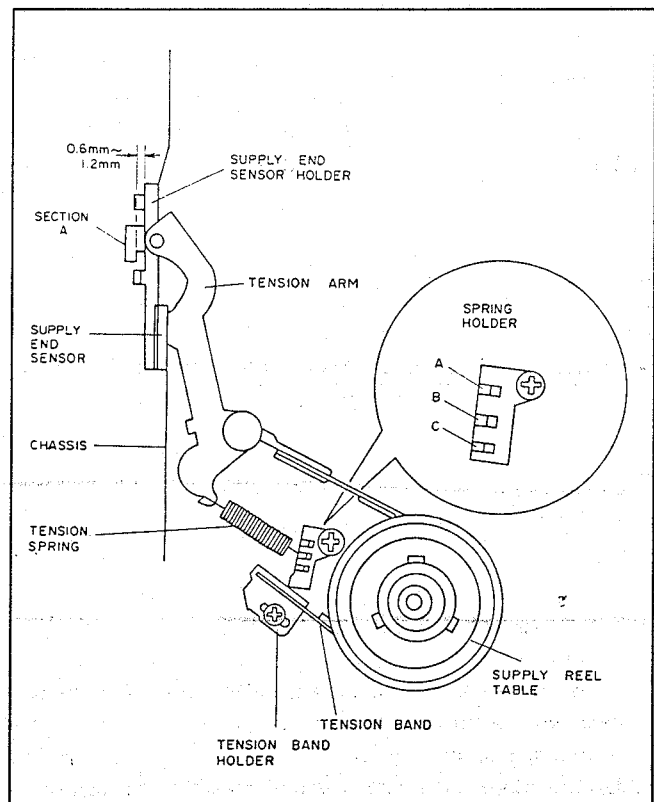


Fig. 3-4 Tension Pole Position/Tension Adjustment

Impedance Roller Height Adjustment (Fig. 3-5)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the impedance roller.
3. Turn the impedance roller height adjusting nut so that the gap between the top of the impedance roller and the top of the jig is 1.5mm to 2.5mm.
4. Load a blank tape, run it and check that the tape does not ride over the upper and lower edge of the roller.

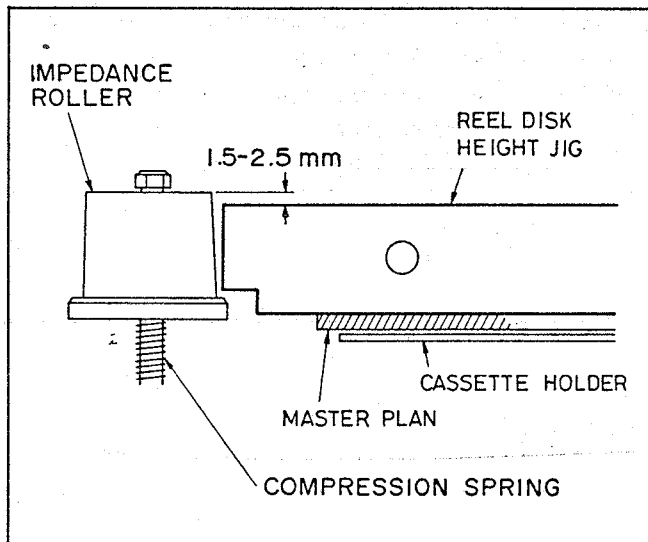


Fig. 3-5 Impedance Roller Height Adjustment

Guide Pole Height Adjustment (Fig. 3-6)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the guide pole.
3. Turn the guide pole height adjusting nut so that the gap between the upper flange of the guide pole and the top of the jig is $0.1\text{mm} \pm 0.1\text{mm}$.
4. Load a blank tape, run it and check that the tape does not ride over the upper and lower flanges of the pole.

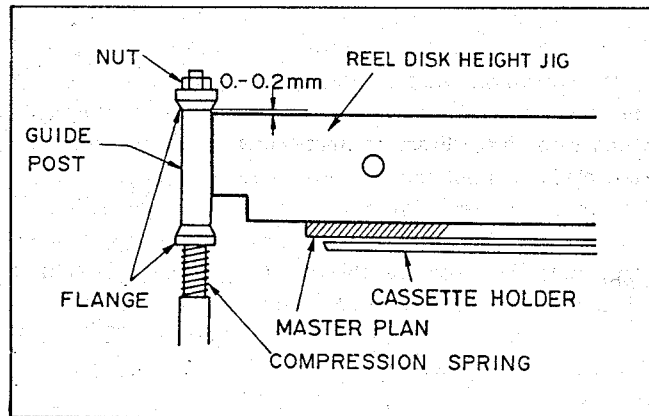


Fig. 3-6 Guide Pole Height Adjustment

Guide Roller Height Adjustment (Figs. 3-7, 3-8)

1. Remove the cassette lid, left case and mount the master plane.
2. Place a reel disk height jig on the master plane and fit it to the guide roller.
3. Tighten the guide roller fixing screw at the position when the upper flange of the guide roller and the top of the jig match.
4. Run the tape and check that the tape does not curl and ride over, and then perform the electrical adjustment.
5. Connect the oscilloscope to TP204 on the main board.
6. Playback the colour bar test tape and set the tracking control to the click position.
7. Check that the FM waveform is flat.
8. Then check that the FM drops at the start and end of the envelope are equal when the tracking control is turned to the left and right.
9. When the FM drops at the start and of the envelope are not equal, loosen the guide roller fixing screw, turn the guide roller a little to the left and right so that they are equal.
10. Tighten the fixing screw.

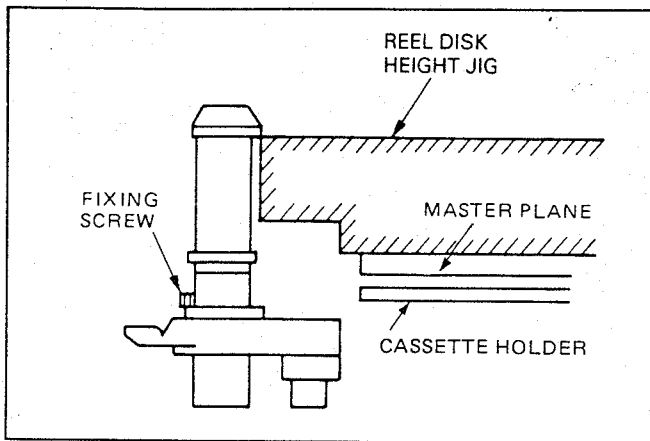


Fig. 3-7 Guide Roller Height Adjustment

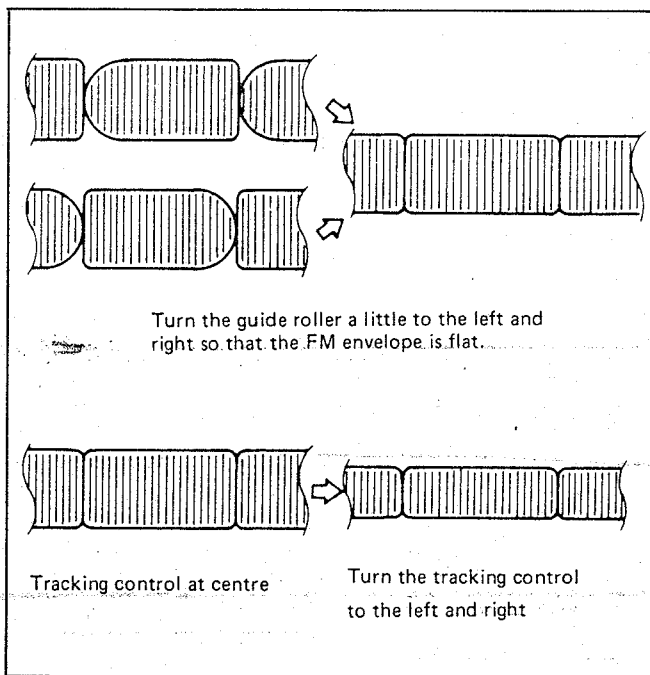


Fig. 3-8 Guide Roller Height Adjustment

A/C Head Adjustment (Figs. 3-9, 3-10, 3-11, 3-12)

Perform the height, tilt and azimuth adjustments repeatedly to determine the A/C head installation position, then adjust X value.

Detailed adjustment below is the procedure when the A/C head is replaced; be sure to do precise adjustment after rough adjustment.

Rough adjustment

1. Remove the cassette lid and left case before making adjustment.
2. Check that it is 2.5 – 3 mm between the top of Nut (A) and point of the shaft. If it is not, adjust Nut (A).
3. Install the height reference plate in its proper position.
4. Adjust azimuth Screw (B), Tilt Screw (C) and Screw (F) so the height difference between the height reference plate and A/C head base (1) is 1 – 2 mm and A/C head bases (1) and (2) are parallel.

Precise adjustment

5. Connect the oscilloscope to PG903-6 on the main board.
6. Playback a 6-kHz audio signal on alignment tape.
7. Adjust azimuth screw (B) and tilt screw (C) for maximum output.

X-value adjustment

8. Connect the oscilloscope to TP204 on the main board.
9. Trigger the oscilloscope at SW30Hz. (Use TP205 on the main board)
10. Set the Tracking control (RV101) to the detent (fixed) position.
11. Loosen two (2) screws (D and E).
12. Playback a alignment tape.
13. Carefully move the A/C head base plate in either direction for maximum head envelope output by adjusting the X-value adjust point.
14. Lock two (2) screws (D and E) with paint.

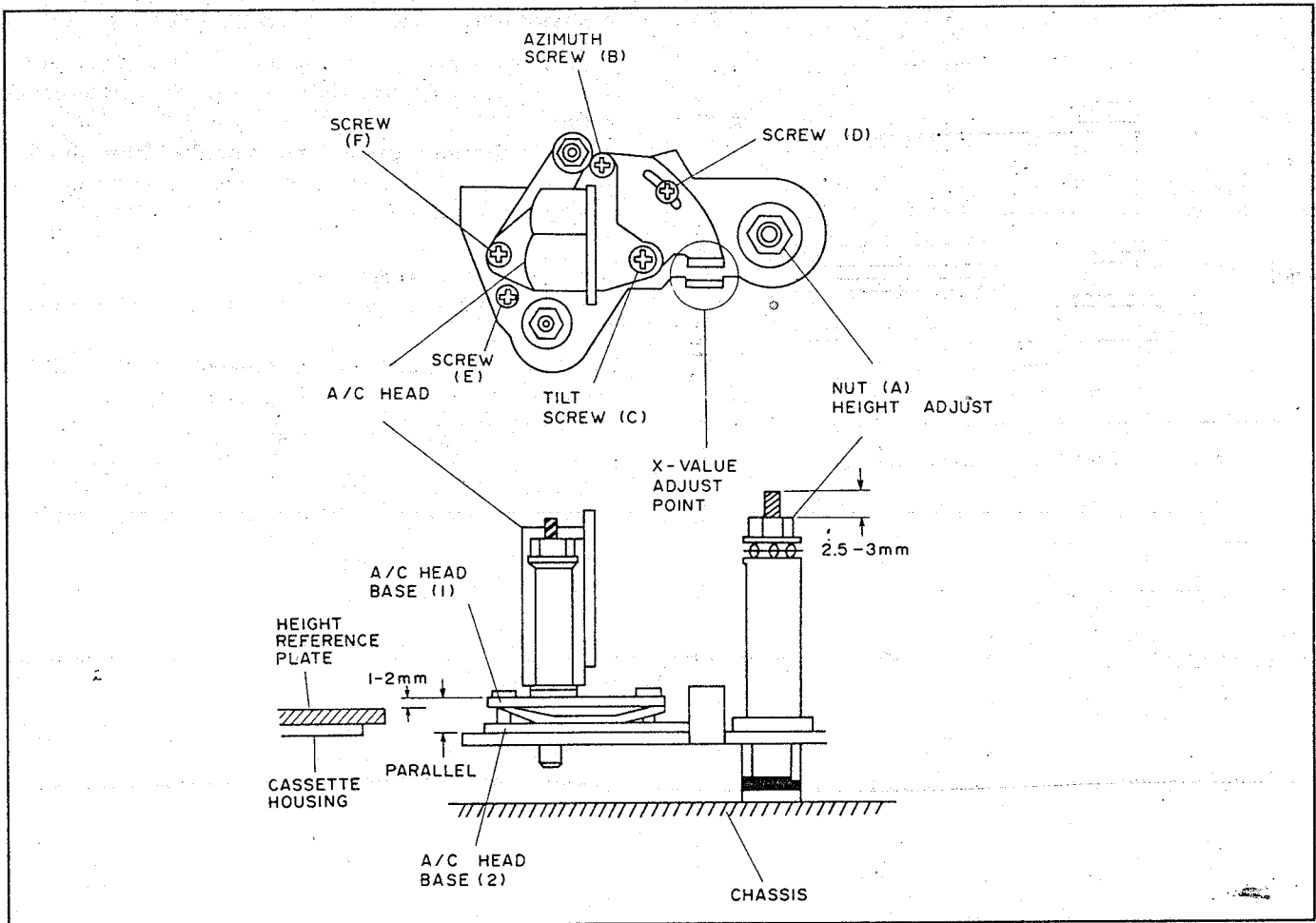


Fig. 3-9 A/C Head Adjustment

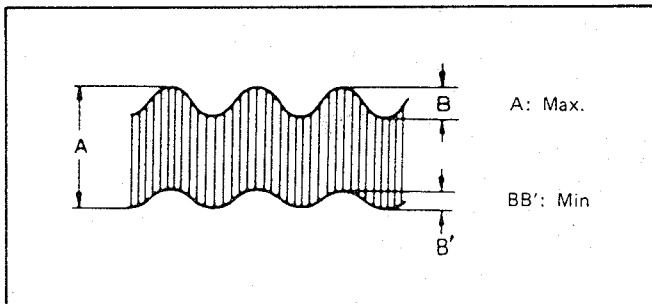


Fig. 3-10 A/C Head Adjustment

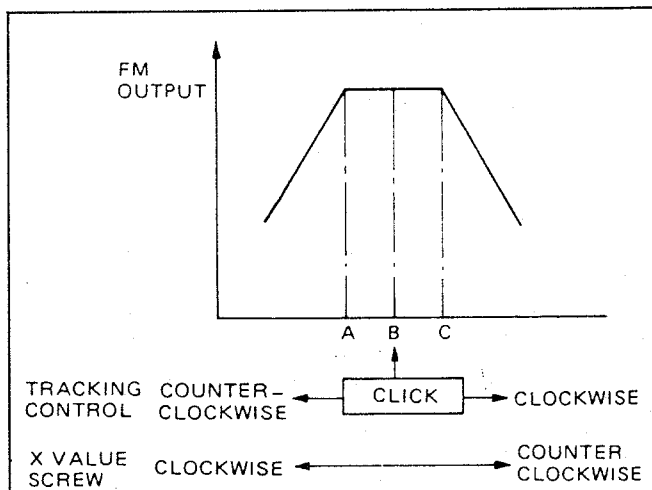


Fig. 3-11 A/C Head Adjustment

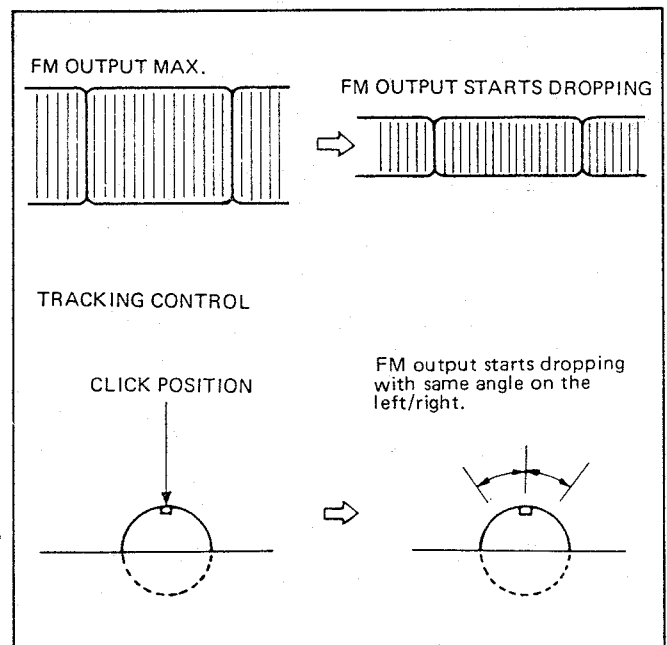


Fig. 3-12 A/C Head Adjustment

Adjustment After Replacing Cylinder (Video Head)

When the cylinder is replaced, the relative height between the cylinder and guide roller and the X value, etc. drift, so adjustments of the tape transport system and servo system are required.

However, the drifts in the relative height and X value are very little when the cylinder is replaced normally, so that can be corrected by electrical adjustments.

1. Check the no curl crease occurs around the guide roller.
Adjust the guide roller height when they occur.
2. Perform tracking preset adjustments (Servo section).
3. Adjust the X value (described in "A/C Head Adjustment").
4. Check the flatness and level fluctuations of the FM output. The checking method is described later.
5. Adjust the servo section and Y/Chroma section.
 - Head Switching Point Adjustment
 - Tracking Preset Adjustment
 - Record Luminance Level Adjustment
 - Record Chroma Level Adjustment

Check Flatness and Level Fluctuations of the FM Output

1. Set the tracking control to the click position.
2. Fine adjust the voltage level range of the oscilloscope and set the FM output to 4 graduations.
3. Turn the tracking control to set the maximum amplitude of the FM output to 3 graduations.
4. Check that the minimum amplitude is more than 2 graduations.
5. Check that the level difference between the maximum and minimum amplitudes is less than 13%.

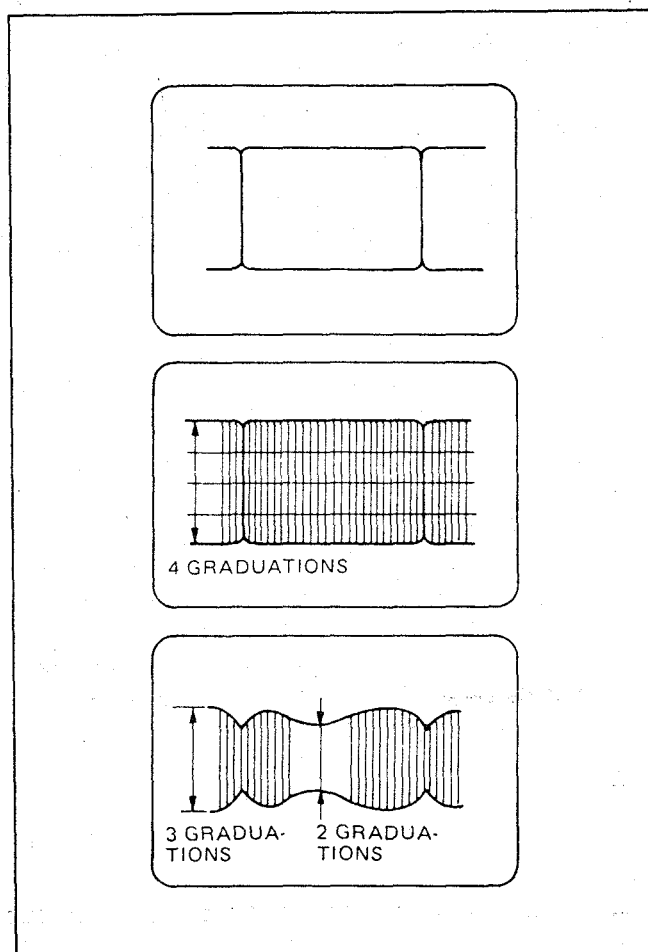


Fig. 3-13

3. TENSION AND TORQUE CHECKS

It is necessary to check the tension, torque and compression strength in the tape take-up section and moving section to smoothen the tape transport and to satisfy the basic performance of the VTR. When the tape transport is not

smooth or the tape speed is abnormal detect the faulty section by this checking, and then check again after replacing the faulty parts with normal ones to complete the work.

Item	VTR Operation Mode	Measured Reel	Measurement Value	Remarks
Main brake torque	STOP	Supply	100g.cm ~	Note 1
		Take-up	80g.cm ~	
Slack removal torque	UNLOADING	Supply	90 ~ 200g.cm	Note 1
Fast forward torque	F. FWD	Take-up	400g.cm ~	Note 1
Rewind torque	REW	Supply	400g.cm ~	Note 1
Take-up torque	PLAY	Take-up	80 ~ 100g.cm	Note 1
Back-tension torque	F. FWD	Supply	4 ~ 10g.cm	Note 2
	REW	Take-up		

Note 1: This is the value measured using the torque gauge and torque adapter while sliding the torque gauge at the speed of 0.8 rps. However, the main brake torque shows the value measured while moving the take-up reel clockwise and the supply reel counterclockwise by hand at the speed of 0.8 rps.

Note 2: This the value measured using the dummy reel and fan type tension gauge while drawing the take-up reel disk counterclockwise and the supply reel disk clockwise at the speed of 50mm/s.

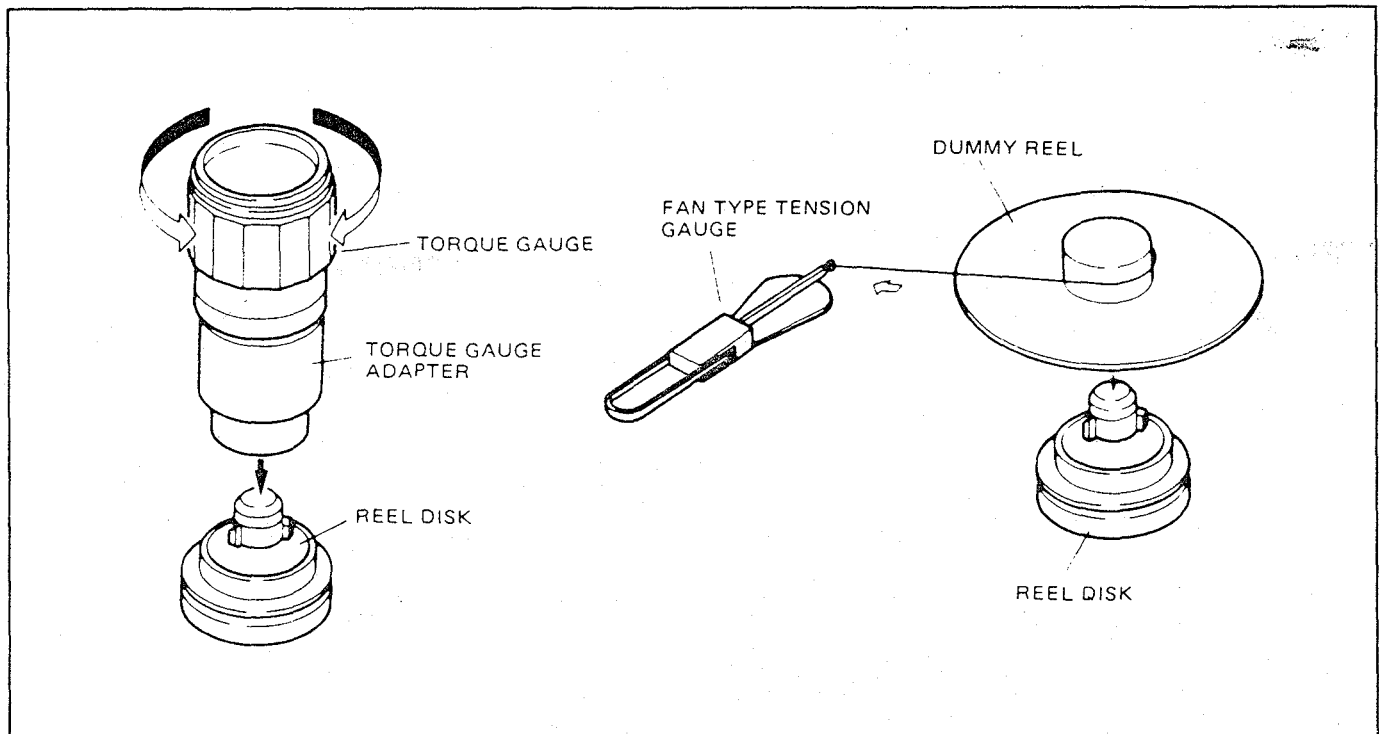


Fig. 3-14

ELECTRICAL ADJUSTMENT

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SETTING OF VHS MOVIE

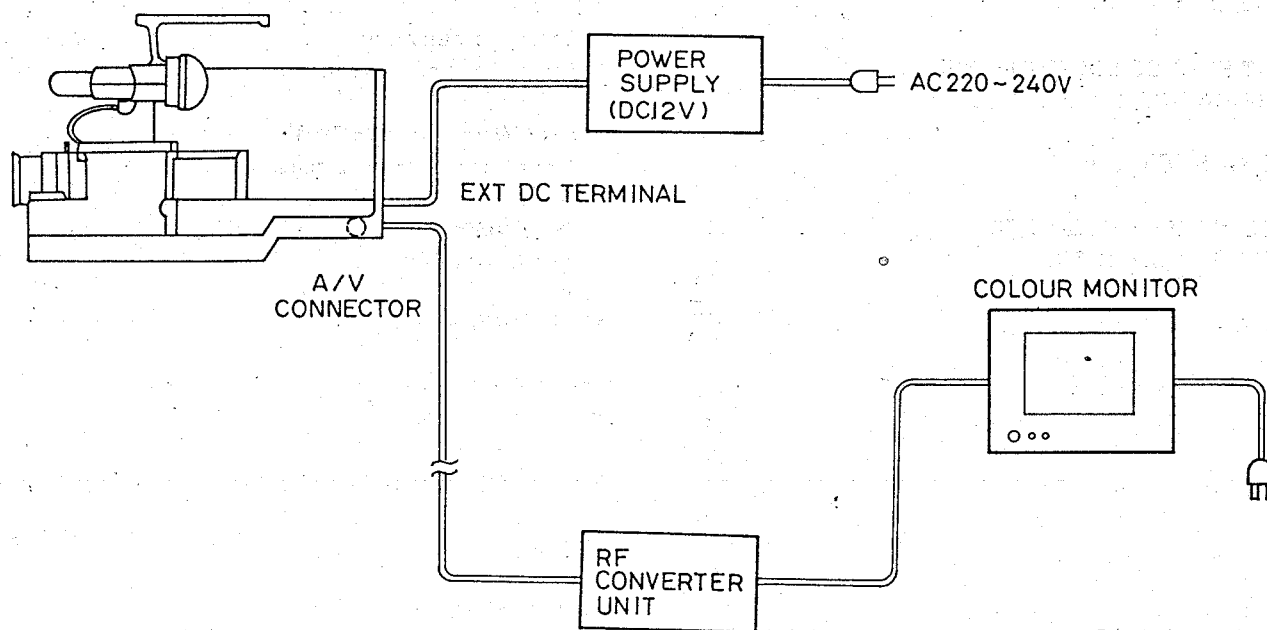


Fig. 4-1 Correct Setup Adjustment

CIRCUIT BOARDS LOCATION AND IDENTIFICATION

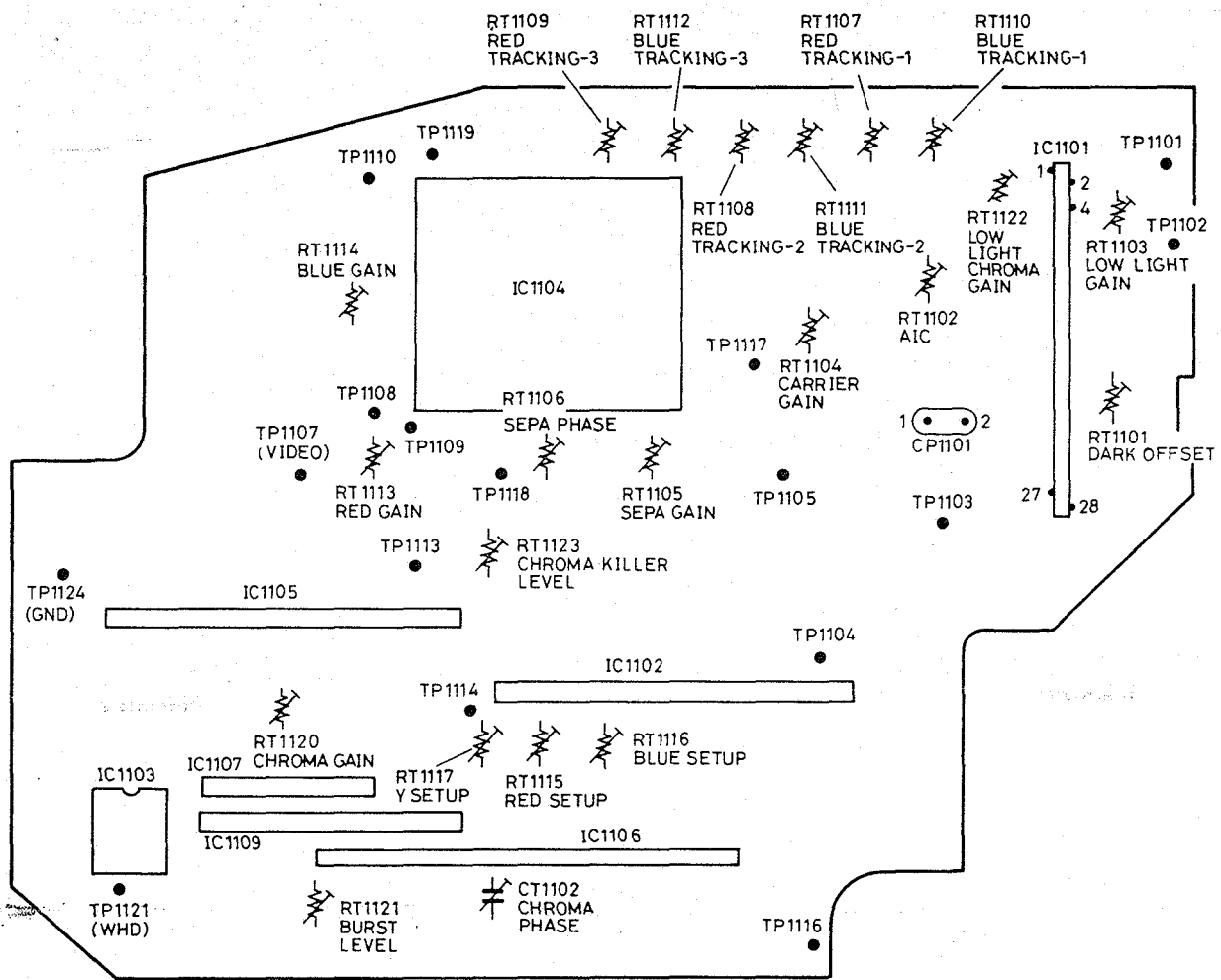


Fig. 4-2 Process Circuit Board (Component Side)

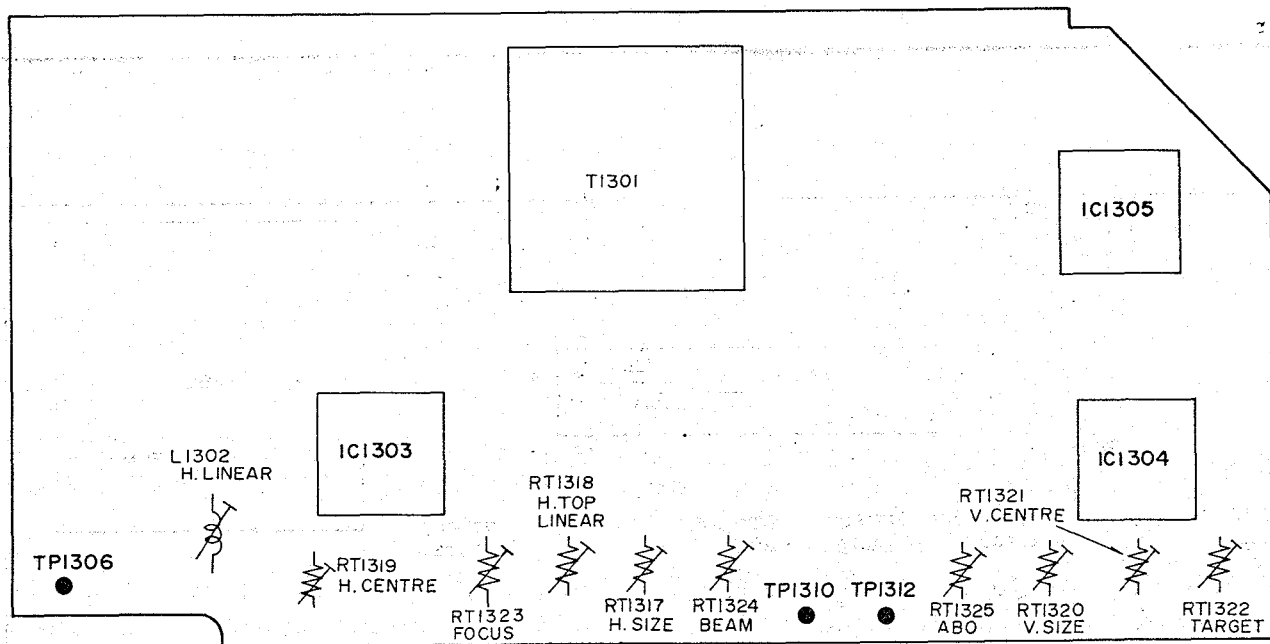


Fig. 4-3 Deflection Circuit Board (Component Side)

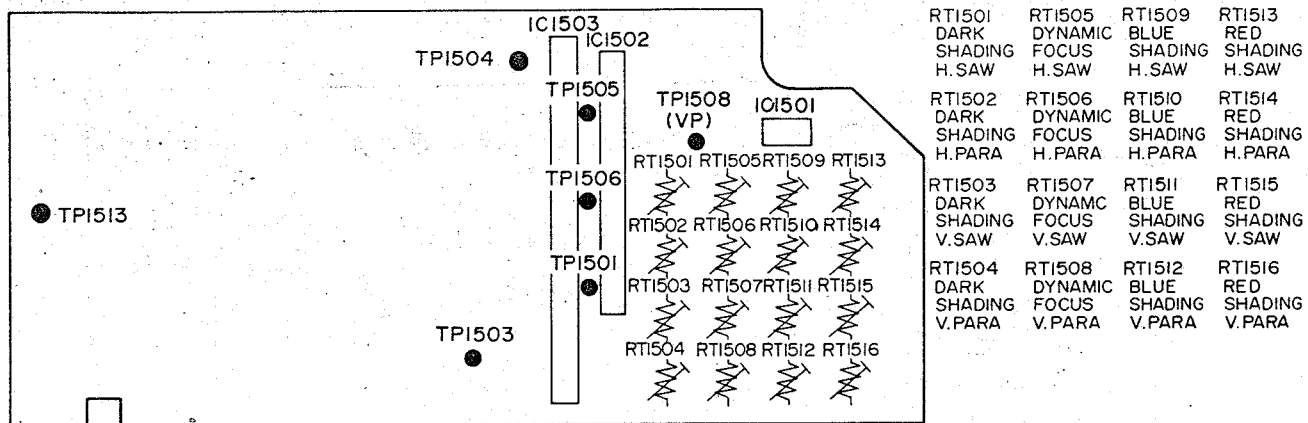


Fig. 4-4 Regulator Circuit Board (Solder Side)

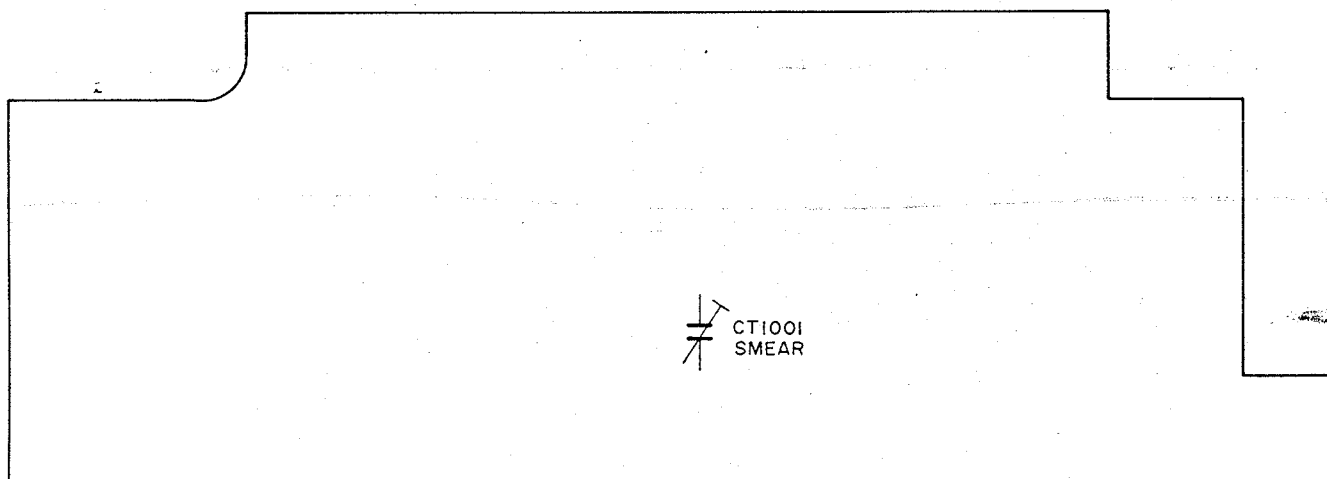


Fig. 4-5 Preamp Circuit Board (Solder Side)

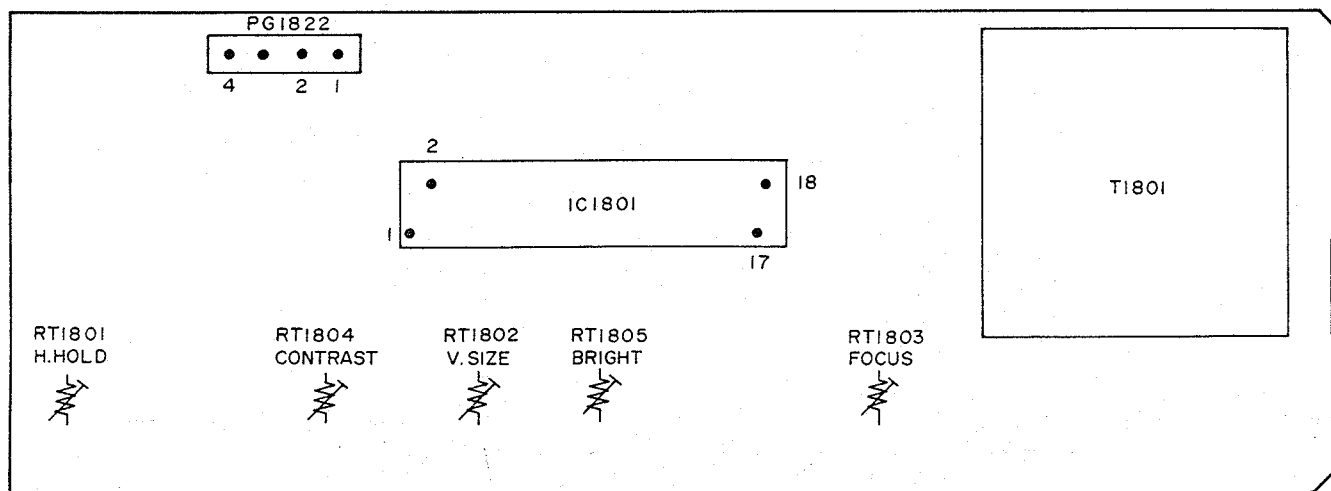


Fig. 4-6 Electronic Viewfinder Circuit Board (Component Side)

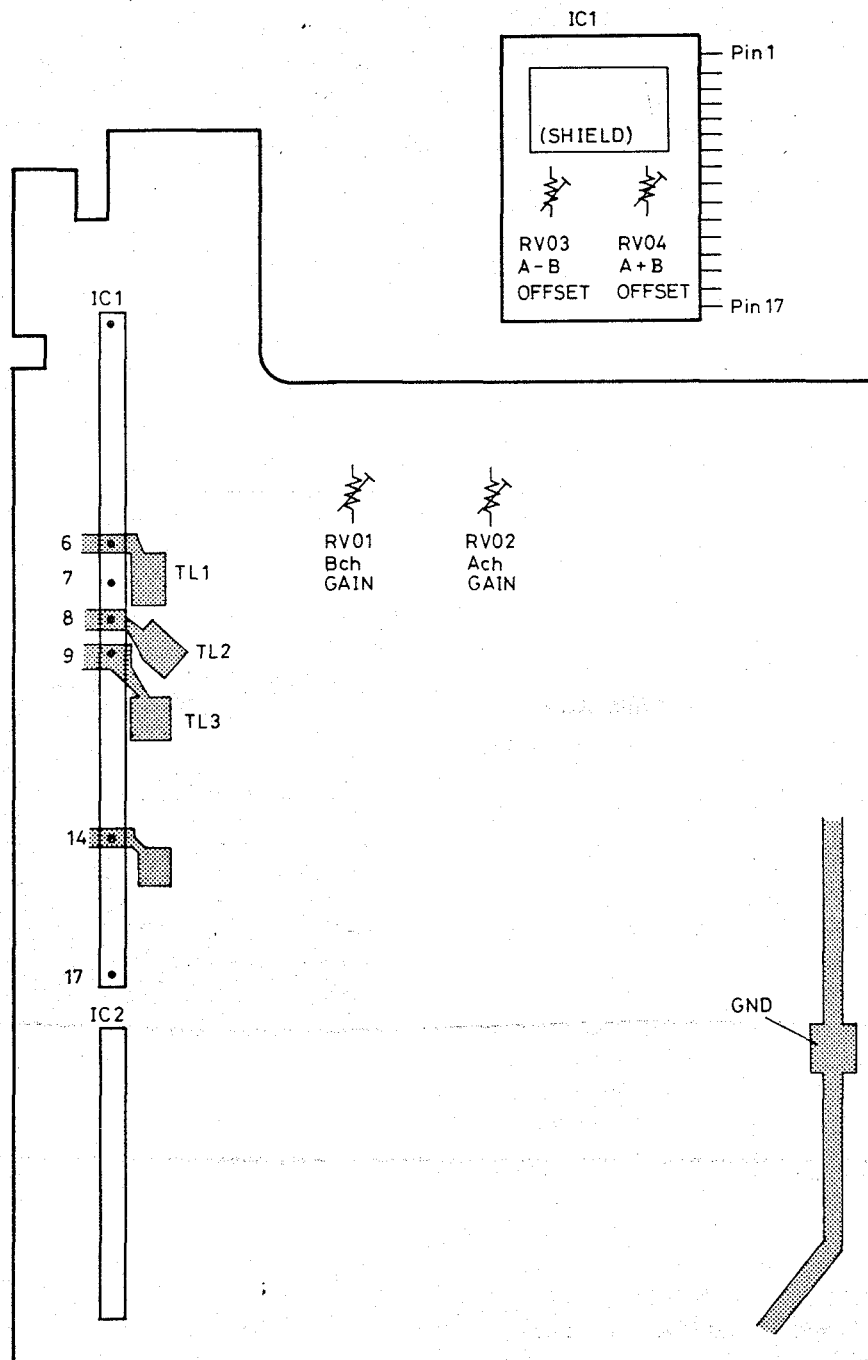


Fig. 4-7 Auto Focus Circuit Board (Solder Side)

CAMERA SECTION

TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of VHS MOVIE.

Oscilloscope (10:1 Probe)
Digital Voltmeter (DVM)
Frequency Counter
Vectorscope
Colour Video Monitor
Gray Scale Chart with 11 steps
3200°K Light Box
Colour Bar Chart
Light Meter
Backfocus Test Chart B
Adjustment Chart
Light balancing Filter
DC Power Supply (12V)

ADJUSTMENT CONDITIONS

Setting Up

Connect the VHS MOVIE and test equipment as shown in Fig. 4-1.

Mount the Light Balancing Filter (Parts No. 7099207) to the lens.

Aim the camera at the chart fully over the video period when otherwise not specified.

Preset Position of Customer Controls and Switches

VTR/CAMERA Switch CAMERA position
AUTO FOCUS Switch MANUAL position
IRIS Control CENTER position
IRIS Switch AUTO position

White Balance Setup

1. Cap the lens.
2. Set the STAND-BY switch to OPERATE position.
3. Set the OPERATE button to "OFF".
4. Set the WHITE BAL switch to centre position.
5. Set the OPERATE button to "ON".
6. Connect the DVM to TP1117.
7. Adjust CHROMA KILLER LEVEL control (RT1123) for $2.45V \pm 0.01V$.
8. Set LOW LIGHT CHROMA GAIN control (RT1122) to mechanical centre position.

CAMERA ADJUSTMENTS

Dynamic Focus Release (Figs. 4-4, 4-8, 4-9, 4-10)

Test Point:

TP1503 (DYNAMIC FOCUS CORRECT) Regulator

Adjust:

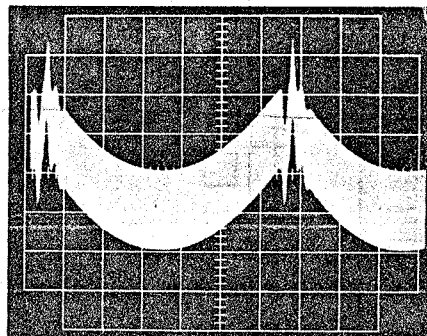
RT1505 (DYNAMIC FOCUS H. SAW) Regulator

RT1506 (DYNAMIC FOCUS H. PARA) Regulator

RT1507 (DYNAMIC FOCUS V. SAW) Regulator

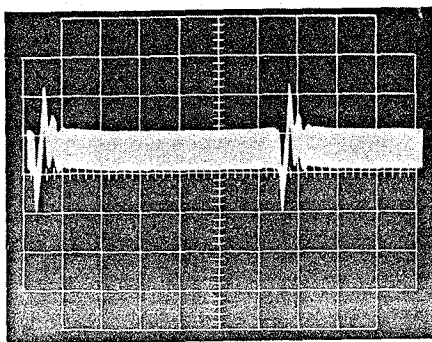
RT1508 (DYNAMIC FOCUS V. PARA) Regulator

1. Cap the lens.
2. Connect the oscilloscope to TP1503.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust DYNAMIC FOCUS H. SAW control (RT1505) and DYNAMIC FOCUS H. PARA control (RT1506) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust DYNAMIC FOCUS V. SAW control (RT1507) and DYNAMIC FOCUS V. PARA control (RT1508) to make the waveforms flat.



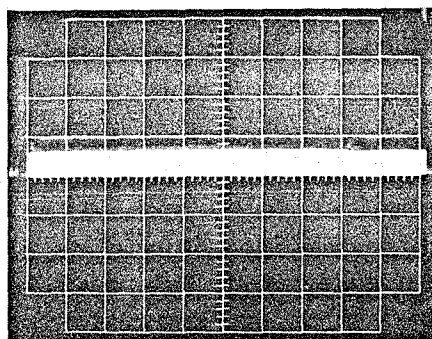
NO GOOD

Fig. 4-8 Dynamic Focus Releasement



H.RATE
GOOD

Fig. 4-9 Dynamic Focus Release



V.RATE
GOOD

Fig. 4-10 Dynamic Focus Release

R and B Signal Shading Release (Figs. 4-4, 4-11, 4-12)

Test Points:

TP1505 (RED SHADING CORRECT)	Regulator
TP1504 (BLUE SHADING CORRECT)	Regulator

Adjust:

RT1513 (RED SHADING H. SAW)	Regulator
RT1514 (RED SHADING H. PARA)	Regulator
RT1515 (RED SHADING V. SAW)	Regulator
RT1516 (RED SHADING V. PARA)	Regulator
RT1509 (BLUE SHADING H. SAW)	Regulator
RT1510 (BLUE SHADING H. PARA)	Regulator
RT1511 (BLUE SHADING V. SAW)	Regulator
RT1512 (BLUE SHADING V. PARA)	Regulator

1. Cap the lens.
2. Connect the oscilloscope channel-1 to TP1505.
3. Connect the oscilloscope channel-2 to TP1504.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust RED SHADING H. SAW control (RT1513) and RED SHADING H. PARA control (RT1514) to make the waveforms at TP1505 flat.
6. Adjust BLUE SHADING H. SAW control (RT1509) and BLUE SHADING H. PARA control (RT1510) to make the waveforms at TP1504 flat.
7. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)

8. Adjust RED SHADING V. SAW control (RT1515) and RED SHADING V. PARA control (RT1516) to make the waveforms at TP1505 flat.
9. Adjust BLUE SHADING V. SAW control (RT1511) and BLUE SHADING V. PARA control (RT1512) to make the waveforms at TP1504 flat.

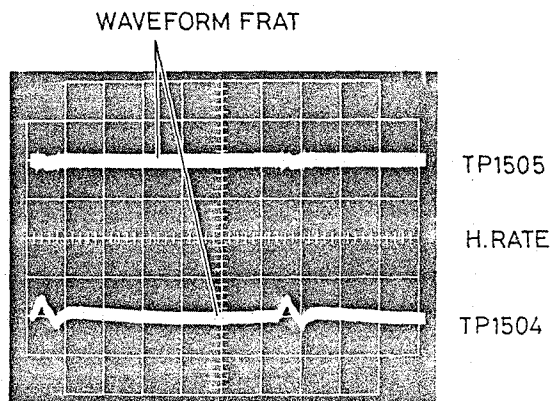


Fig. 4-11 R and B Signal Shading Release

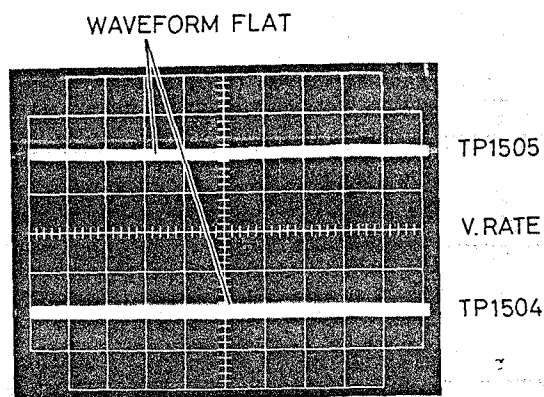


Fig. 4-12 R and B Signal Shading Release

R and B Signal Tracking Release (Fig. 4-2)

Adjust:	RT1112 (BLUE TRACKING-3)	Process
	RT1111 (BLUE TRACKING-2)	Process
	RT1110 (BLUE TRACKING-1)	Process
	RT1109 (RED TRACKING-3)	Process
	RT1108 (RED TRACKING-2)	Process
	RT1107 (RED TRACKING-1)	Process

1. Cap the lens.
2. Set BLUE TRACKING-3 control (RT1112), BLUE TRACKING-2 control (RT1111), BLUE TRACKING-1 control (RT1110), RED TRACKING-3 control (RT1109), RED TRACKING-2 control (RT1108) and RED TRACKING-1 control (RT1107) to their mechanical centres.

Target Voltage Adjustment (Fig. 4-3)

Test Point: TP1306 (TARGET)
Adjust: RT1322 (TARGET)

Deflection
Deflection

Loss of target voltage will cause a "no picture" condition.

1. Cap the lens.
2. Connect the DVM to TP1306.
3. Adjust TARGET control (RT1322) for $51V \pm 0.1V$.

Beam Current Adjustment (Figs. 4-2, 4-3, 4-13, 4-14)

Test Point: TP1101 (PRE-VIDEO)
Adjust: RT1324 (BEAM)
RT1325 (ABO)

Process
Deflection
Deflection

This procedure adjusts the electron beam by varying the G1 voltage. When the voltage is too high, the shading amount increases. When the voltage is too low the picture tends to "washout" or not appear at all.

Note: Perform this adjustment quickly with the lens cap removed after connecting all the measuring equipment, etc. with the lens capped. Cap the lens immediately after the adjustment is completed.

1. Aim the camera at adjustment chart.
2. Connect TP1116 to ground (TP1124).
3. Connect the oscilloscope to TP1101.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Turn AIC control (RT1102) fully counterclockwise (As seen from component side)
6. Adjust BEAM control (RT1324) until the waveform is clipped at $1.4Vp-p \pm 0.1V$ (Fig. 4-13).
7. Disconnect TP1116 from ground (TP1124).
8. Adjust ABO control (RT1325) until the waveform is clipped at $2.2Vp-p \pm 0.1V$ (Fig. 4-14).

Note: After adjustment is complete, turn RT1102 mechanical centre.

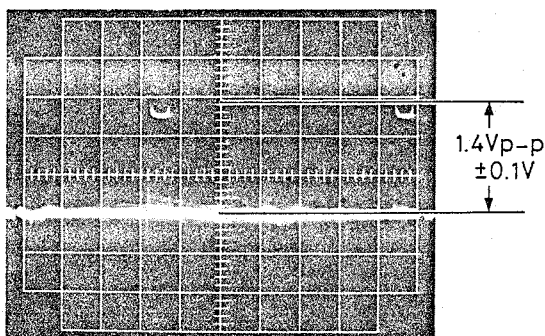


Fig. 4-13 Beam Current Adjustment

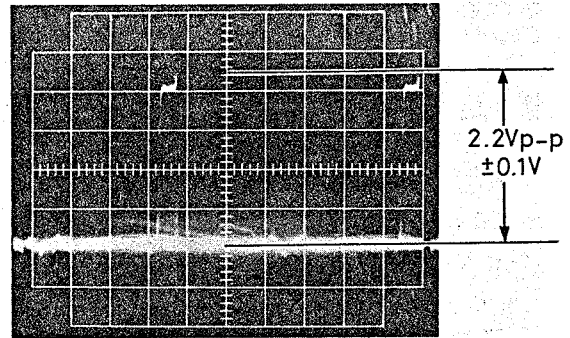


Fig. 4-14 Beam Current Adjustment

Smear Adjustment (Figs. 4-5, 4-15)

Adjust: CT1001 (SMEAR)

Preamp

Observe: Colour Monitor

1. Aim the camera at the gray scale chart.
2. Adjust SMEAR control (CT1001) to minimize smear in sections where black changes to gray and white changes to gray on the gray scale chart.

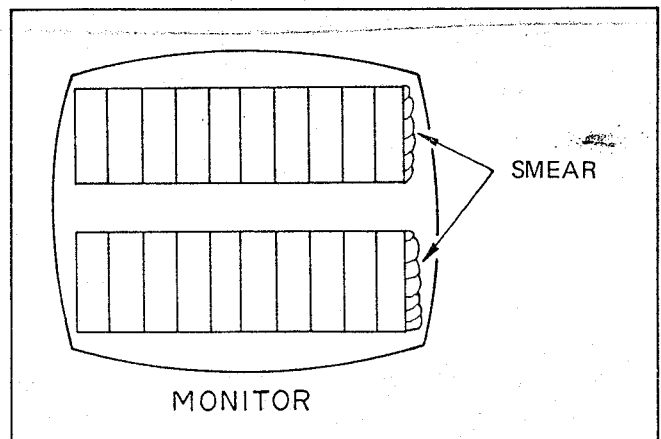


Fig. 4-15 Smear Adjustment

Dark Shading Adjustment (Figs. 4-2, 4-4, 4-16, 4-17)

Test Point: TP1103 (AGC OUT) Process
 Adjust: RT1501 (DARK SHADING H. SAW) Regulator
 RT1502 (DARK SHADING H. PARA) Regulator
 RT1503 (DARK SHADING V. SAW) Regulator
 RT1504 (DARK SHADING V. PARA) Regulator

This adjustment corrects shading of the bias light so that the whole picture becomes dark without colour noise when the camera is aimed at a dark place.

1. Cap the lens.
2. Connect the oscilloscope to TP1103 via a resistor (18k ohm).
3. Trigger the oscilloscope at V.rate. (Use TP1508 on Regulator board.)
4. Adjust DARK SHADING V. SAW control (RT1503) and DARK SHADING V. PARA control (RT1504) so that the waveform is flat.
5. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
6. Adjust DARK SHADING H. SAW control (RT1501) and DARK SHADING H. PARA control (RT1502) so that the waveform is flat.

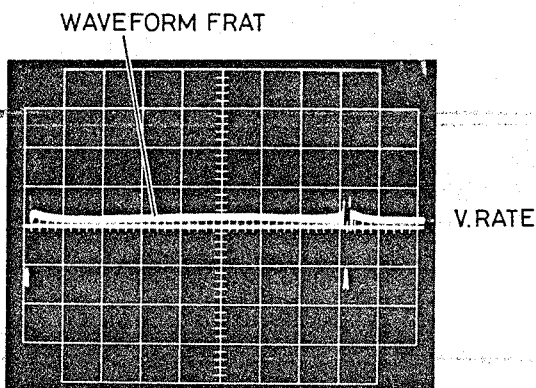


Fig. 4-16 Dark Shading Adjustment

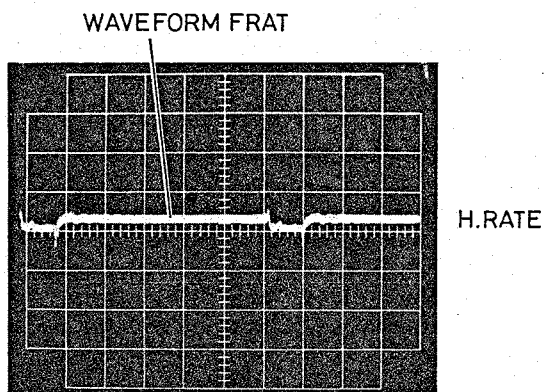


Fig. 4-17 Dark Shading Adjustment

Dark Offset Adjustment (Figs. 4-2, 4-18, 4-19)

Test Points: VIDEO OUTPUT (TP1107) Process
 TP1103 (AGC OUT) Process
 Adjust: RT1101 (DARK OFFSET) Process

This adjustment sets the black level.

1. Cap the lens.
2. Connect the oscilloscope to TP1103 via resistor (18k ohm).
3. Trigger the oscilloscope at H.rate. (Use TP1121 on process board.)
4. Adjust AGC OFFSET control (RT1101) so that the bottom edge at waveform matches the blanking level. (See Fig. 4-18)
5. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
6. Adjust Y SETUP control (RT1117) for 53.5mVp-p $\pm$ 7mV from blanking level to the center of the waveform. (See Fig. 4-19)

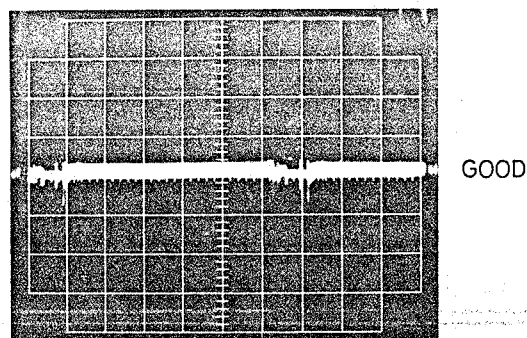


Fig. 4-18 Dark Offset Adjustment

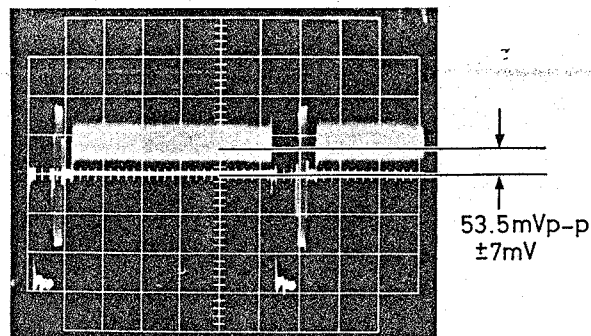


Fig. 4-19 Dark Offset Adjustment

AGC Maximum Gain Adjustment (Fig. 4-2)

Test Points: TP1102

Process

Adjust: RT1103 (LOW LIGHT GAIN)

Process

1. Cap the lens.
2. Connect the DVM to TP1102.
3. Adjust the LOW LIGHT GAIN control (RT1103) for $1.25\text{ V} \pm 0.05\text{ V}$.

AIC Level Adjustment (Figs. 4-2, 4-20)

Test Point: VIDEO OUTPUT (TP1107)

Process

Adjust: RT1102 (AIC)

Make this adjustment to set the balance point of the automatic iris. Depending on the AIC setting (too high or too low), an incorrect adjustment could cause the image to appear dark or bright under normal lighting.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Turn CHROMA GAIN control (RT1120) fully counter-clockwise (as viewed from the component side).
5. Adjust AIC (RT1102) for $700\text{mVp-p} \pm 10\text{mV}$ the top of the gray scale waveform.

Note: After adjustment is complete, turn RT1120 fully clockwise.

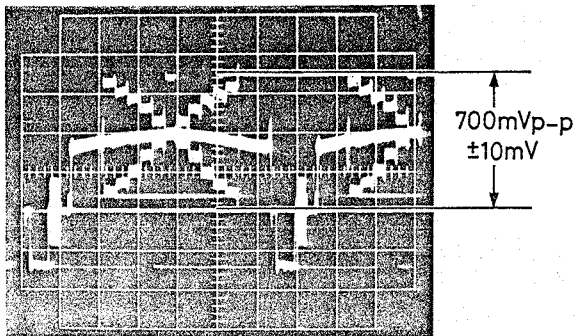


Fig. 4-20 AIC Level Adjustment

Backfocus Adjustment (Fig. 4-21)

The purpose of this adjustment is to ensure proper focus tracking throughout the zoom range.

1. Remove left case and right case.
2. Set chart illumination to 50 lux to 100 lux.
3. Aim the camera at the backfocus chart 10 feet (3 meters) away.
4. Set the focus ring to 10 feet (3 meters) position.
5. Loosen the hexagonal screw.
6. Zoom in (close up/telephoto) and adjust the lens focus.
7. Zoom out (wide angle) and insert the backfocus adjustment driver into the backfocus adjustment point and adjust the backfocus.
8. Zoom in again and adjust the lens focus.
9. Zoom out again and adjust the backfocus.
10. Repeat the procedure until the focus tracks throughout the zoom range.

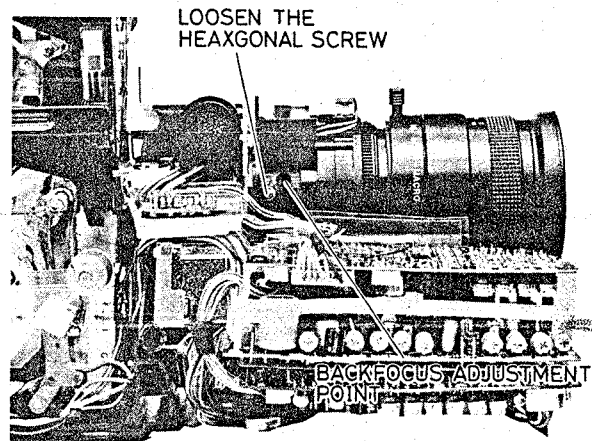


Fig. 4-21 Backfocus Adjustment

Chroma Carrier Level Adjustment (Figs. 4-2, 4-3, 4-22)

Test Point: TP1108 (CARRIER OUT) Process
Adjust: RT1323 (FOCUS) Deflection
RT1104 (CARRIER GAIN) Process

The purpose of this procedure is to adjust the saticon focus electrode voltage so the beam is focused on the photoconductive film and also to adjust the carrier level of the chroma signal. Incorrect carrier level setting can cause colour and tint problems.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to TP1108.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust FOCUS control (RT1323) so that the waveforms are maximum.
5. Adjust CARRIER GAIN control (RT1104) so that the waveform is $700\text{mVp-p} \pm 50\text{mV}$.

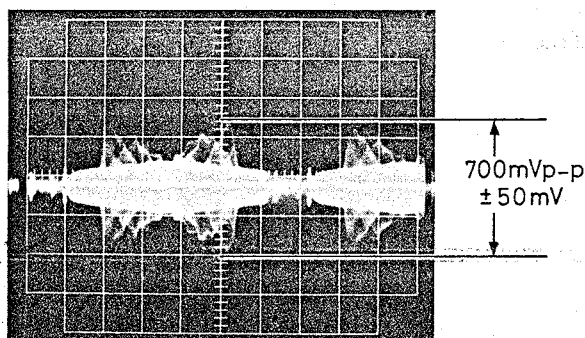


Fig. 4-22 Chroma Carrier Level Adjustment

Vertical Size Adjustment (Figs. 4-2, 4-3, 4-4, 4-23, 4-24)

Test Point: TP1108 (CARRIER OUT) Process
TP1513 (5V) Regulator
TP1310 Deflection
Adjust: RT1320 (V. SIZE) Deflection

This adjustment sets the proper vertical scanning of the saticon. Improper adjustment could cause distorted images (circle becoming an ellipse) or a space at the top or bottom of the picture.

1. Marking the center on the monitor screen.
2. Connect TP1310 and TP1513.
3. Adjust V.CENTER (RT1321) so that the centre mark came to the centre of the screen.
4. Remove the short circuit between TP1310 and TP1513.
5. Aim the camera at the light box (white chart).
6. Connect the oscilloscope to TP1108.
7. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
8. Adjust V. SIZE control (RT1320) for minimum beats during the vertical period. (Figs. 4-23, 4-24)

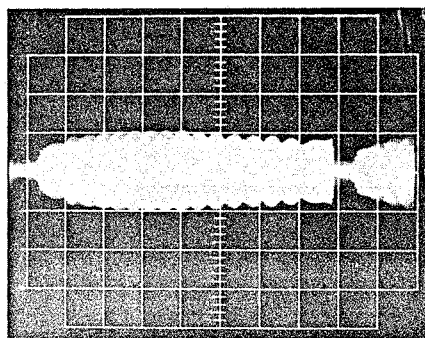


Fig. 4-23 Vertical Size Adjustment

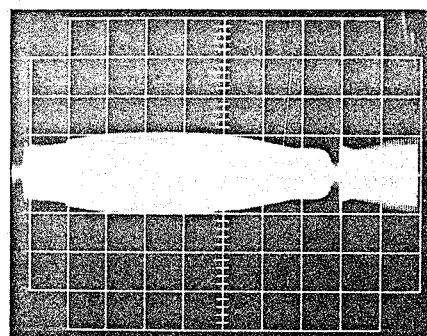


Fig. 4-24 Vertical Size Adjustment

Horizontal Size and Horizontal Linearity Adjustment

(Figs. 4-2, 4-3, 4-25, 4-26, 4-27)

Test Point: CP1101-1 Process
Adjusts: RT1317 (H. SIZE) Deflection
RT1318 (H. TOP LINEAR) Deflection
L1302 (H. LINEAR) Deflection

The purpose of this adjustment is to set the proper horizontal scanning of the saticon. Improper adjustment could cause distorted images or the colour balance to shift (probably to green).

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope to CP1101-1.
3. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
4. Delay the waveform and observe its centre.
5. Adjust H. SIZE control (RT1317) so that the carrier in the centre portion of the signal at CP1101-1 is minimum.
6. Adjust H. TOP LINEAR control (RT1318) for minimum carrier over the wheel Y signal. Adjust H. LINEAR control (L1302) so the carrier at the starting portion of Y signal at point CP1101-1 is minimum, and the starting portion of Y signal becomes as flat as possible.

Note: When use the oscilloscope not provided a delay function adjust items 5 and 6 with triggering the oscilloscope at H. rate.

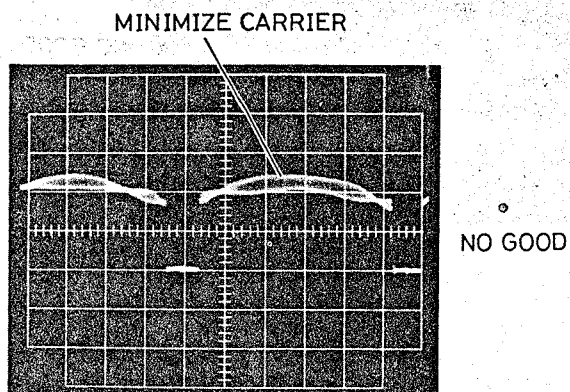


Fig. 4-25 Horizontal Size and Linearity Adjustment

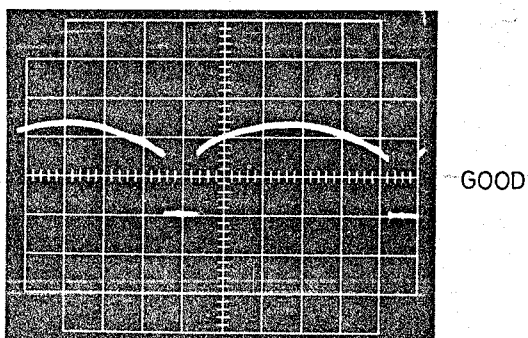


Fig. 4-26 Horizontal Size and Linearity Adjustment

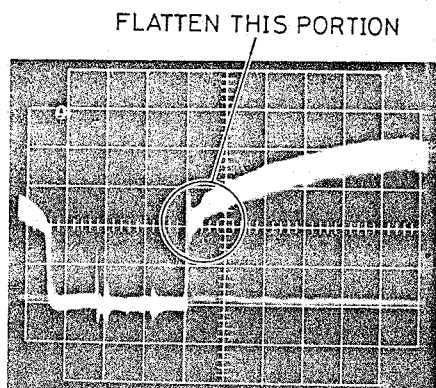


Fig. 4-27 Horizontal Size and Linearity Adjustment

Horizontal Centre and Vertical Centre Adjustment (Figs. 4-3, 4-4)

Adjust:	RT1319 (H. CENTRE)	Deflection
	RT1321 (V. CENTRE)	Deflection
Test Points:	TP1310	Deflection
	TP1312	Deflection
	TP1513 (5V)	Regulator
Observe:	Colour Monitor	

This adjustment determines the horizontal and vertical deflection positions in the saticon. If misadjusted a space could appear on either side of the picture.

*Vertical Center Adjustment

1. Marking the centre on the monitor screen.
2. Connect TP1310 and TP1513.
3. Adjust V. CENTRE (RT1321) so that the centre mark come to the centre of the screen.
4. Remove short circuit between TP1310 and TP1513.

*Horizontal Centre Adjustment

1. Marking the centre on the monitor screen.
2. Connect TP1312 and TP1513.
3. Adjust H. CENTRE (RT1319) so that the centre mark come to the centre of the screen.
4. Remove short circuit between TP1312 and TP1513.

Chroma Setup Adjustment (Figs. 4-2, 4-28)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1115 (RED SETUP)	Process
	RT1116 (BLUE SETUP)	Process

This adjustment makes the picture black without colour noise when the camera is aimed at a dark place.

1. Cap the lens.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE SETUP control (RT1116) so that the top edge of chroma level at TP1114 matches the blanking level.
6. Adjust RED SETUP control (RT1115) so that the top edge of chroma level at TP1113 matches the blanking level.

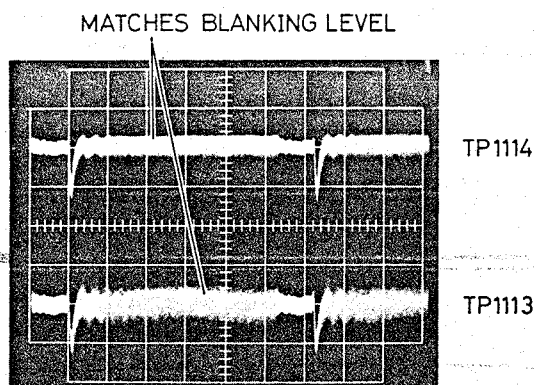


Fig. 4-28 Chroma Setup Adjustment

R and B Signal Gain and Separation Adjustment

1) R and B Signal Separation Adjustment (Figs. 4-2, 4-29)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1105 (SEPA GAIN)	Process
	RT1106 (SEPA PHASE)	Process

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust SEPA PHASE control (RT1106) and SEPA GAIN control (RT1105) for minimum flicker in the waveforms.

2) R and B Signal Gain Adjustment (Figs. 4-2, 4-30)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1114 (BLUE GAIN)	Process
	RT1113 (RED GAIN)	Process

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE GAIN control (RT1114) so that the top edge of chroma level at TP1114 matches the blanking level.
6. Adjust RED GAIN control (RT1113) so that the top edge of chroma level at TP1113 matches the blanking level.

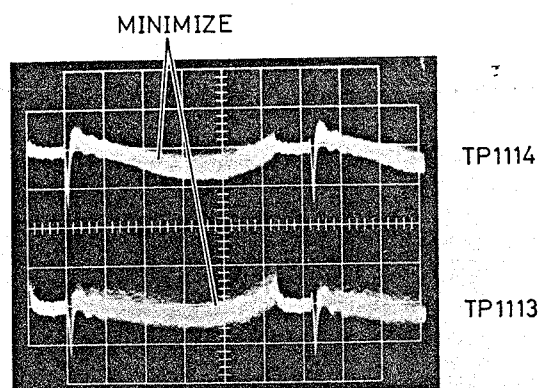


Fig. 4-29 R and B Signal Separation Adjustment

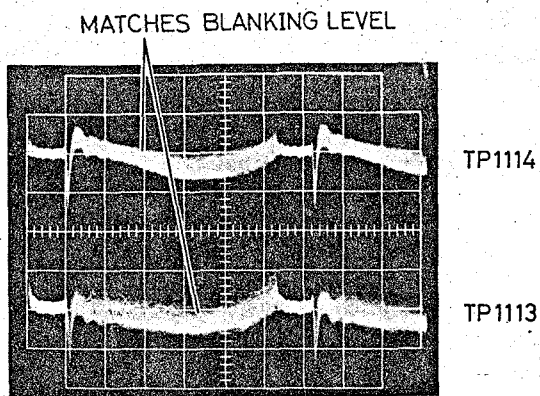


Fig. 4-30 R and B Signal Gain Adjustment

Focus Preset Adjustment (Figs. 4-2, 4-3, 4-31)

Test Points: TP1109 (R SIGNAL) Process
 TP1110 (B SIGNAL) Process
 Adjust: RT1323 (FOCUS) Deflection

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1109.
3. Connect the oscilloscope channel-2 to TP1110.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust FOCUS control (RT1323) so that the gray level of the waveform is 1st - 6th steps from the top are maximum.

Note: When the waveform fluctuates regardless of correct synchronization during the above adjustment, adjust RT1105 and RT1106 so that fluctuations of the waveform becomes small and then adjust RT1323.

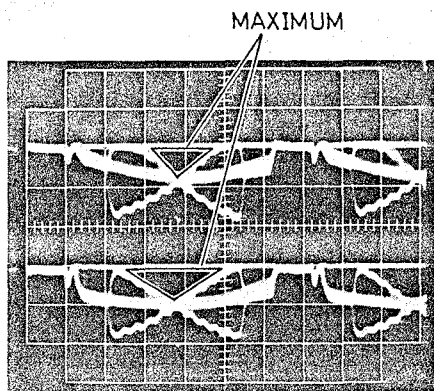


Fig. 4-31 Focus Preset Adjustment

Dynamic Focus Preset Adjustment

(Figs. 4-2, 4-4, 4-32, 4-33)

Test Point: TP1113 (R-YL SIGNAL) Process
 TP1114 (B-YL SIGNAL) Process
 Adjust: RT1508 (DYNAMIC FOCUS V. PARA) Regulator
 RT1507 (DYNAMIC FOCUS V. SAW) Regulator
 RT1506 (DYNAMIC FOCUS H. PARA) Regulator
 RT1505 (DYNAMIC FOCUS H. SAW) Regulator

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust DYNAMIC FOCUS H. PARA control (RT1506) and DYNAMIC FOCUS H. SAW control (RT1505) to make the waveforms flat.
6. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
7. Adjust DYNAMIC FOCUS V. PARA control (RT1508) and DYNAMIC FOCUS V. SAW control (RT1507) to make the waveforms flat.

Note: Repeat this adjustment.

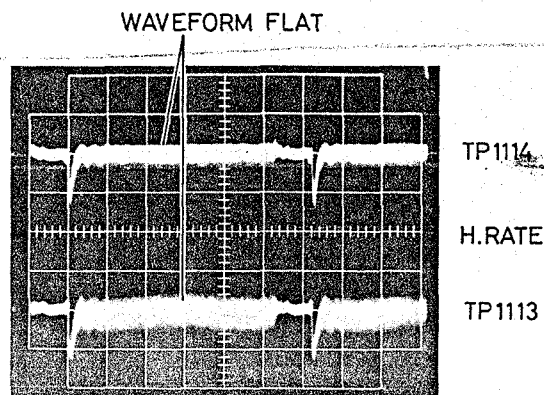


Fig. 4-32 Dynamic Focus Preset Adjustment

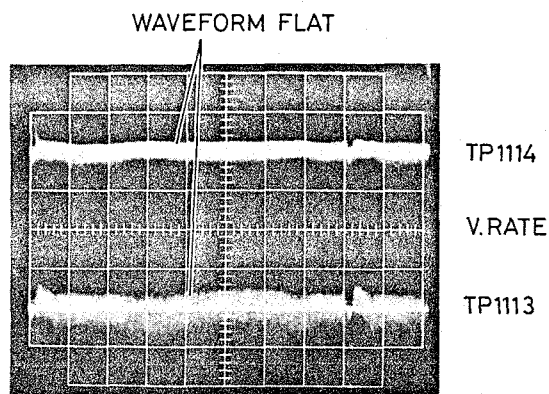


Fig. 4-33 Dynamic Focus Preset Adjustment

R and B Signal Shading Preset Adjustment

1) R Signal Shading Preset Adjustment

(Figs. 4-2, 4-4, 4-34, 4-35)

Test Point:	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1513 (RED SHADING H. SAW)	Regulator
	RT1514 (RED SHADING H. PARA)	Regulator
	RT1515 (RED SHADING V. SAW)	Regulator
	RT1516 (RED SHADING V. PARA)	Regulator

1. Aim the camera at the light Box (white chart).
2. Connect the oscilloscope to TP1113.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust RED SHADING H. SAW control (RT1513) and RED SHADING H. PARA control (RT1514) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust RED SHADING V. SAW control (RT1515) and RED SHADING V. PARA control (RT1516) to make the waveforms flat.

2) B Signal Shading Preset Adjustment

(Figs. 4-2, 4-4, 4-34, 4-35)

Test Point:	TP1114 (B-YL SIGNAL)	Process
Adjust:	RT1509 (BLUE SHADING H. SAW)	Regulator
	RT1510 (BLUE SHADING H. PARA)	Regulator
	RT1511 (BLUE SHADING V. SAW)	Regulator
	RT1512 (BLUE SHADING V. PARA)	Regulator

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope to TP1114.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust BLUE SHADING H. SAW control (RT1509) and BLUE SHADING H. PARA control (RT1510) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust BLUE SHADING V. SAW control (RT1511) and BLUE SHADING V. PARA control (RT1512) to make the waveforms flat.

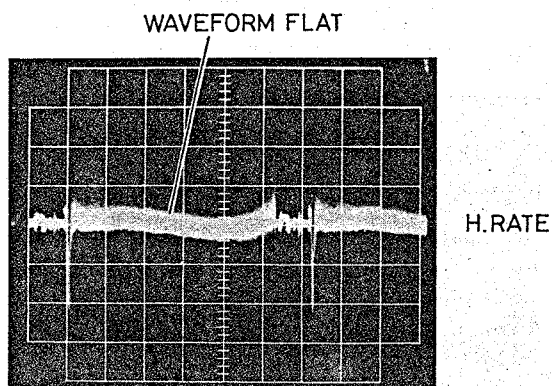


Fig. 4-34 R and B Signal Shading Preset Adjustment

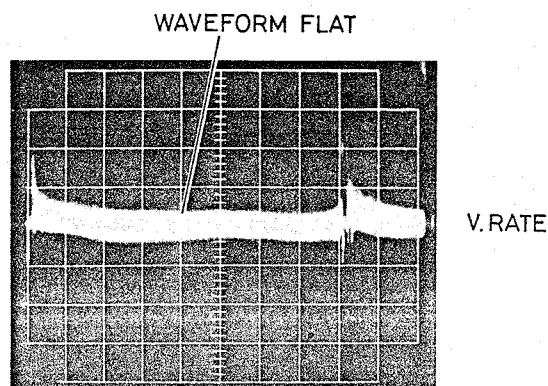


Fig. 4-35 R and B Signal Shading Preset Adjustment

R and B Signal Tracking Preset Adjustment (Figs. 4-2, 4-36)

Test Points:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1114 (BLUE GAIN)	Process
	RT1113 (RED GAIN)	Process
	RT1110 (BLUE TRACKING-1)	Process
	RT1107 (RED TRACKING-1)	Process
	RT1111 (BLUE TRACKING-2)	Process
	RT1108 (RED TRACKING-2)	Process
	RT1112 (BLUE TRACKING-3)	Process
	RT1109 (RED TRACKING-3)	Process

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board)
5. Adjust BLUE GAIN control (RT1114), BLUE TRACKING-1 control (RT1110), BLUE TRACKING-2 control (RT1111) and BLUE TRACKING-3 control (RT1112) to make the waveforms flat and match the blanking level at TP1114.
6. Adjust RED GAIN control (RT1113), RED TRACKING-1 control (RT1107), RED TRACKING-2 control (RT1108) and RED TRACKING-3 control (RT1109) to make the waveforms flat and match the blanking level at TP1113.

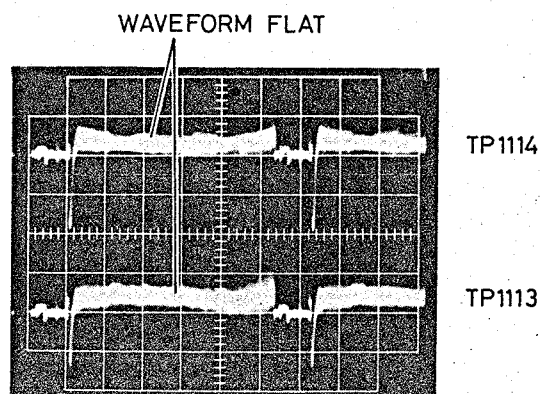


Fig. 4-36 R and B Signal Tracking Preset Adjustment

Focus Adjustment (Figs. 4-2, 4-3, 4-37)

Test Point: TP1109 (R SIGNAL) Process
 TP1110 (B SIGNAL) Process
 Adjust: RT1323 (FOCUS) Deflection

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1109.
3. Connect the oscilloscope channel-2 to TP1110.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust FOCUS control (RT1323) so that the gray level of the waveform is level of 1st – 6th steps from the bottom are maximum.

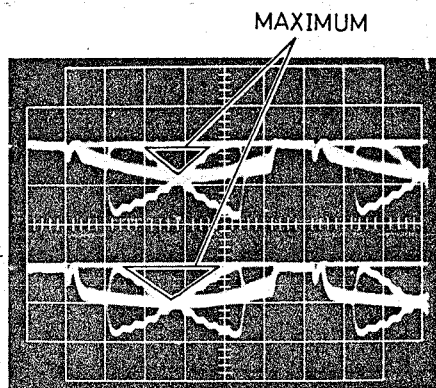


Fig. 4-37 Focus Adjustment

Chroma Carrier Level Confirmation (Fig. 4-2)

Test Point: TP1108 (CARRAIER OUT) Process

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to TP1108.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Confirm that the waveform is $700\text{mV} \pm 50\text{m Vp-p}$.
 If it is not within the range, readjust CHROMA CARRIER LEVEL control (RT1104).

Dynamic Focus Adjustment (Figs. 4-2, 4-4, 4-38, 4-39)

Test Point: TP1113 (R-YL SIGNAL) Process
 TP1114 (B-YL SIGNAL) Process
 Adjust: RT1508 (DYNAMIC FOCUS V. PARA) Regulator
 RT1507 (DYNAMIC FOCUS V. SAW) Regulator
 RT1506 (DYNAMIC FOCUS H. PARA) Regulator
 RT1505 (DYNAMIC FOCUS H. SAW) Regulator

This adjustment corrects for focusing errors away from the centre of the tube caused by scanning a flat surface. Misadjustment of these controls will cause colour unevenness to increase.

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust DYNAMIC FOCUS H. PARA control (RT1506) and DYNAMIC FOCUS H. SAW control (RT1505) to make the waveforms flat.
6. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
7. Adjust DYNAMIC FOCUS V. PARA control (RT1508) and DYNAMIC FOCUS V. SAW control (RT1507) to make the waveforms flat.

Note: Repeat this adjustment.

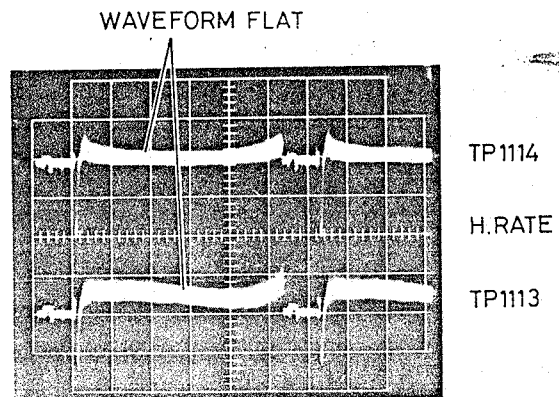


Fig. 4-38 Dynamic Focus Adjustment

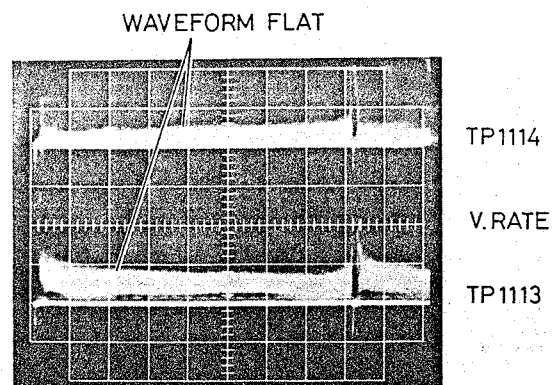


Fig. 4-39 Dynamic Focus Adjustment

R and B Signal Shading Adjustment

1) R Signal Shading Adjustment (Figs. 4-2, 4-4, 4-40, 4-41)

Test Point:	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1513 (RED SHADING H. SAW)	Regulator
	RT1514 (RED SHADING H. PARA)	Regulator
	RT1515 (RED SHADING V. SAW)	Regulator
	RT1516 (RED SHADING V. PARA)	Regulator

The purpose of this adjustment is to correct for red signal colour unevenness.

1. Aim the camera of the light box (White chart).
2. Connect the oscilloscope to TP1113.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust RED SHADING H. SAW control (RT1513) and RED SHADING H. PARA control (RT1514) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust RED SHADING V. SAW control (RT1515) and RED SHADING V. PARA control (RT1516) to make the waveforms flat.

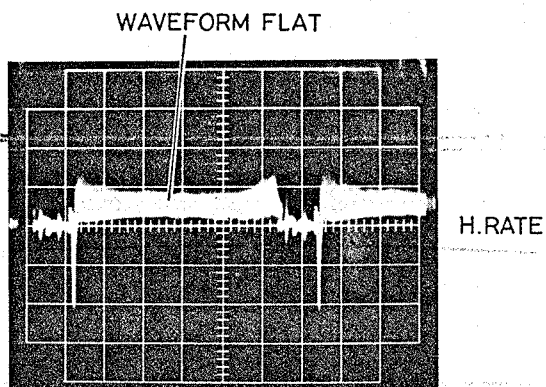


Fig. 4-40 R and B Signal Shading Adjustment

2) B Signal Shading Adjustment (Figs. 4-2, 4-4, 4-40, 4-41)

Test Point:	TP1114 (B-YL SIGNAL)	Process
Adjust:	RT1509 (BLUE SHADING H. SAW)	Regulator
	RT1510 (BLUE SHADING H. PARA)	Regulator
	RT1511 (BLUE SHADING V. SAW)	Regulator
	RT1512 (BLUE SHADING V. PARA)	Regulator

The purpose of this adjustment is to correct for blue signal colour unevenness.

1. Aim the camera at the light box (white chart).
2. Connect the oscilloscope to TP1114.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust BLUE SHADING H. SAW control (RT1509) and BLUE SHADING H. PARA control (RT1510) to make the waveforms flat.
5. Trigger the oscilloscope at V. rate. (Use TP1508 on Regulator board.)
6. Adjust BLUE SHADING V. SAW control (RT1511) and BLUE SHADING V. PARA control (RT1512) to make the waveforms flat.

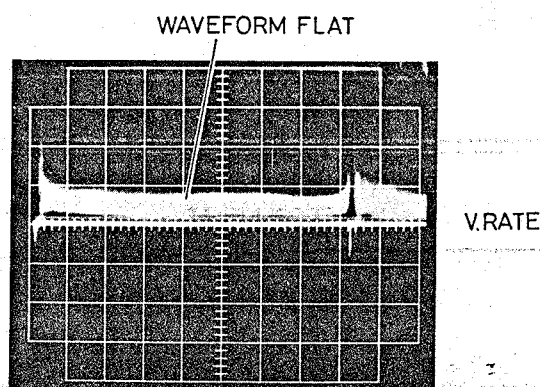


Fig. 4-41 R and B Signal Shading Adjustment

R and B Signal Tracking Adjustment (Figs. 4-2, 4-42)

Test Point:	TP1114 (B-YL SIGNAL)	Process
	TP1113 (R-YL SIGNAL)	Process
Adjust:	RT1114 (BLUE GAIN)	Process
	RT1113 (RED GAIN)	Process
	RT1110 (BLUE TRACKING-1)	Process
	RT1107 (RED TRACKING-1)	Process
	RT1111 (BLUE TRACKING-2)	Process
	RT1108 (RED TRACKING-2)	Process
	RT1112 (BLUE TRACKING-3)	Process
	RT1109 (RED TRACKING-3)	Process

These adjustments ensure that the red and blue signals track properly with the Y signal at all light levels.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope channel-1 to TP1114.
3. Connect the oscilloscope channel-2 to TP1113.
4. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
5. Adjust BLUE GAIN control (RT1114), BLUE TRACKING-1 control (RT1110), BLUE TRACKING-2 control (RT1111) and BLUE TRACKING-3 control (RT1112) to make the waveforms flat and match the blanking level at TP1114.
6. Adjust RED GAIN control (RT1113), RED TRACKING-1 control (RT1107), RED TRACKING-2 control (RT1108) and RED TRACKING-3 control (RT1109) to make the waveforms flat and match the blanking level at TP1113.

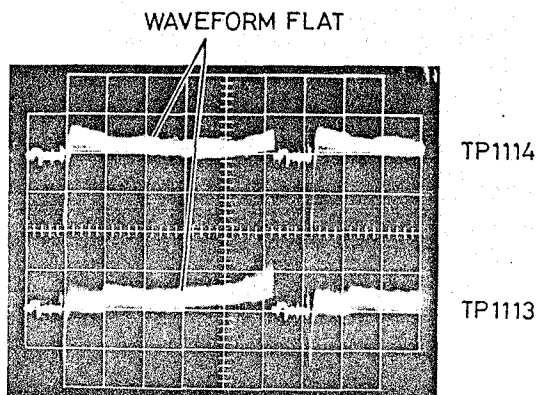


Fig. 4-42 R and B Signal Tracking Adjustment

Burst Level Adjustment (Figs. 4-2, 4-43)

Test Point:	VIDEO OUTPUT (TP1107)	Process
Adjust:	RT1121 (BURST LEVEL)	Process

This adjustment determines the position of colour saturation.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to VIDEO OUTPUT (TP1107).
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust BURST LEVEL control (RT1121) for $280\text{mVp-p} \pm 15\text{mV}$ to the burst level of gray scale waveform.

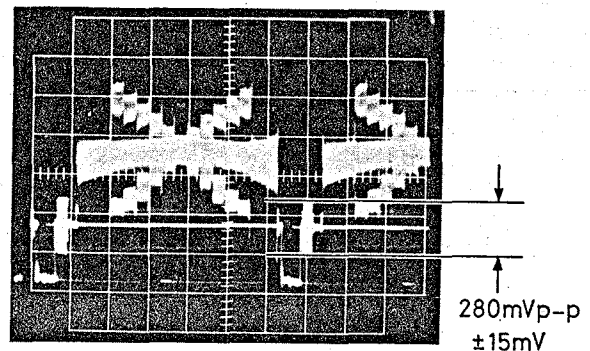


Fig. 4-43 Burst Level Adjustment

Chroma Gain and Phase Adjustment (Figs. 4-2, 4-44)

Test Point: VIDEO OUTPUT (PAL OUT)

Adjust: RT1120 (CHROMA GAIN)
CT1102 (BURST PHASE)

Process
Process

Observe: Colour Monitor

* Adjustment using vectorscope

1. Aim the camera at the colour bar chart.
2. Set the white balance.
3. Connect the VIDEO OUTPUT terminated vectorscope.
4. Adjust CHROMA GAIN control (RT1120) so that the red vector is equal to $220\% \pm 10\%$ when compared to the burst level.
5. Adjust BURST PHASE control (CT1102) to minimize flicker on the monitor screen.

* Adjustment using monitor TV

1. Aim the camera at the colour bar chart.
2. Set the white balance.
3. Adjust CHROMA GAIN control (RT1120) so that the tint of the red of the both the TV screen and the colour bar chart match as much as possible.
4. Adjust BURST PHASE control (CT1102) to minimize flicker on the monitor screen.

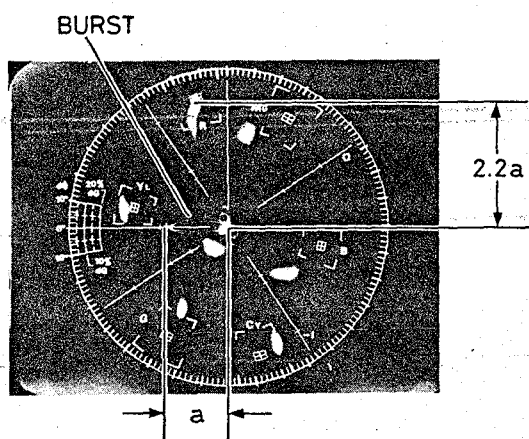


Fig. 4-44 Chroma Gain and Phase Adjustment

Low Light Chroma Gain Adjustment (Figs. 4-2, 4-45)

Test Point: TP1117

Process

Adjust: RT1122 (LOW LIGHT CHROMA GAIN)

Process

RT1123 (CHROMA KILLER LEVEL) Process

Observe: Colour Monitor

This adjustment sets colouring low illumination.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to TP1117.
3. Trigger the oscilloscope at H. rate. (Use TP1121 on Process board.)
4. Adjust LOW LIGHT CHROMA GAIN control (RT1122) so that the waveform is $410 \text{ mVp-p} \pm 10 \text{ mV}$.
5. Aim the camera at a dark place with approx. 20 lux.
6. Set CHROMA KILLER LEVEL control (RT1123) to a position where noise on the monitor screen start to increase abruptly.

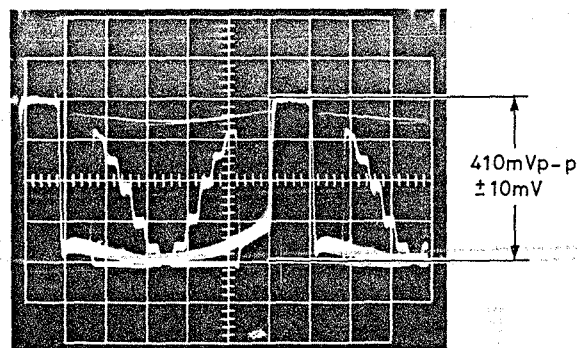


Fig. 4-45 Low Light Chroma Gain Adjustment

White Balance Confirmation

1. Switch the White Balance Control "Auto", and if the picture is greatly different from that when the control is in the "Manual" position, adjust the following.

Chroma Setup Adjustment

R and B Signal Tracking Adjustment

Chroma Gain and Phase Adjustment

VIEWFINDER ADJUSTMENTS

The conditions and connections for viewfinder adjustment are the same as shown in Fig. 4-1.

Horizontal Hold Adjustment (Figs. 4-8, 4-50)

Test Point: TP1801 (TP1802) Electronic Viewfinder

Adjust: RT1801 (H. HOLD) Electronic Viewfinder

This procedure sets the horizon sync frequency during VTR playback.

1. Connect the frequency counter to IC1801-2 on the electronic viewfinder board.
2. Set the H. HOLD (RT1801) to mechanical center.
3. Connect a capacitor ($47\mu\text{F}$) between pins 1 and 2 of PG1822 (TP1801).
4. Adjust H. H18LD (RT801) for $15.75 \pm 0.1\text{kHz}$.
5. Disconnect the capacitor connected between pins 1 and 2 of PG1822.

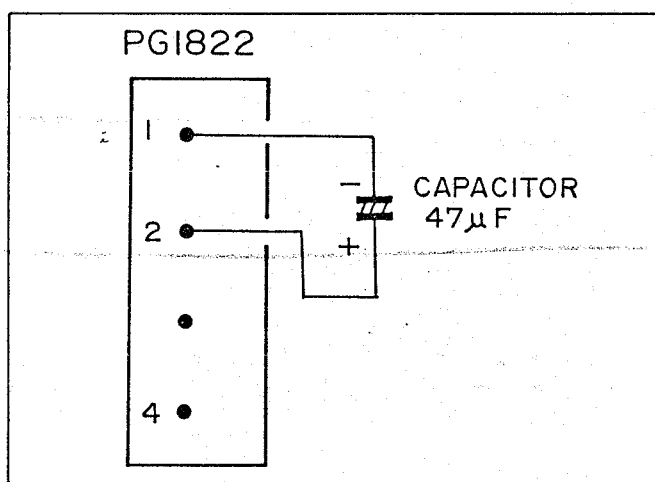


Fig. 4-50. Horizontal Hold Adjustment

Picture Tilt Adjustment (Fig. 4-51)

Adjust: Deflection Coil
Observe: Viewfinder

This procedure is used to set the picture tilt of the EVF image.

1. Make sure the camera is aligned with the chart.
2. Loosen the deflection coil holding screw.
3. Observe the viewfinder, and turn the deflection coil until the image is straight.
4. Tighten the screw holding the deflection coil.

Centering Magnets Adjustment (Fig. 4-51)

Adjust: Centreing Magnets
Observe: Viewfinder

This adjustment sets the centre of the image picked up by the camera to the centre of the EVF screen.

1. Aim the camera at a resolution chart.
2. Adjust the centreing magnets until the centre of the picture (+) comes to the centre of viewfinder raster.

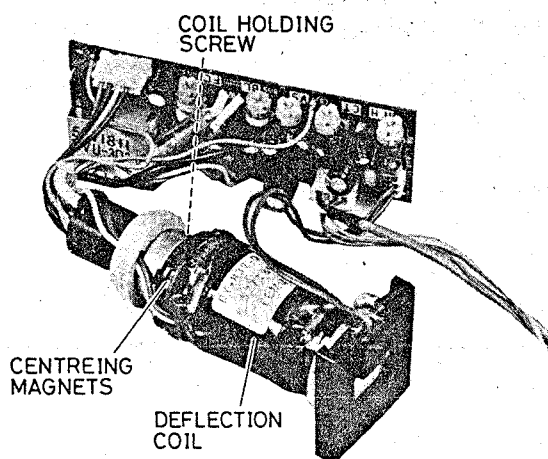


Fig. 4-51 Picture Tilt and Centering Magnets Adjustment

Vertical Size Adjustment (Fig. 4-8)

Adjust: RT1802 (V. SIZE) Electronic Viewfinder
Observe: Viewfinder

This adjustment determines the vertical deflection size.

1. Aim the camera at a resolution chart, and line up the reference arrow head with the edge of the raster (blanking) in the EVF.
2. Adjust V. SIZE (RT1802) so that the circle in the chart is round.

Focus Adjustment (Fig. 4-8)

Adjust: RT1803 (FOCUS) Electronic Viewfinder
Observe: Viewfinder

This adjustment sets the focus so that sharpness of the picture is best.

1. Aim the camera at the resolution chart.
2. Adjust FOCUS (RT1803) for the best resolution in the viewfinder.

Contrast and Brightness Adjustment (Fig. 4-8)

Adjust: RT1804 (CONTRAST) Electronic Viewfinder
RT1805 (BRIGHT) Electronic Viewfinder
Observe: Viewfinder

This procedure sets the normal viewing level of the picture.

1. Aim the camera at the gray scale chart.
2. Adjust BRIGHT (RT1805) and CONTRAST (RT1804) so that B/W tip graduations in the viewfinder screen match those on the monitor.

AUTO FOCUS ADJUSTMENT

1. Offset Adjustment (Figs. 4-7, 4-52)

Test Points:	TL1 (A+B)	Auto Focus
	TL3 (A-B)	Auto Focus
Adjust:	RV04 (A+B OFFSET)	Auto Focus
	RV03 (A-B OFFSET)	Auto Focus

1. Connect IC1-14 and GND.
2. Cover the infrared receiver with thick black paper to shut off the infrared rays.
3. Connect the oscilloscope channel-1 to TL1 (A+B).
4. Connect the oscilloscope channel-2 to TL3 (A-B).
5. Trigger the oscilloscope. (Use TL2 (SZ))
6. Turn the focus ring forcibly to its closeup (1.2m) end.
7. Adjust A+B OFFSET (RV04) so the waveform for channel-1 is minimum.
8. Adjust A-B OFFSET (RV03) so the waveform for channel-2 is minimum.
9. Disconnect short circuit IC1-14 and GND.

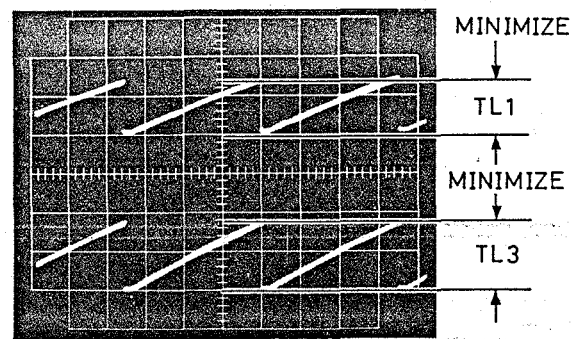


Fig. 4-52 Offset Adjustment

2. Gain Adjustment (Figs. 4-7, 4-53)

Test Point:	TL1 (A+B)	Auto Focus
Test:	RV01 (Bch GAIN)	Auto Focus
	RV02 (Ach GAIN)	

1. Connect IC1-14 and GND.
2. Aim the camera at a white object.
3. Move the object 50cm away from the infrared receiver.
4. Cover the receiver with a sheet of thin transparent paper (tracking paper, etc.).
5. Connect the oscilloscope to TL1 (A+B).
6. Turn the focus ring forcibly to its infinite (∞) end.
7. Adjust Ach GAIN (RV02) first and then adjust Bch GAIN (RV01) to shorten the trailing edge period of the waveforms.
8. Disconnect short circuit IC1-14 and GND.

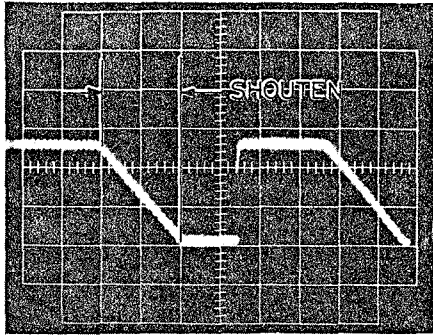


Fig. 4-53 Gain Adjustment

3. Offset Confirmation (Figs. 4-7, 4-52)

Test Points: TL1 (A+B)

Auto Focus

TL3 (A-B)

Auto Focus

1. Connect IC1-14 and GND.
2. Cover the infrared receiver with thick black paper to shut off the infrared rays.
3. Connect the oscilloscope channel-1 to TL-1 (A+B).
4. Connect the oscilloscope channel-2 to TL3 (A-B).
5. Confirm that the waveform is $0V_{p-p} \pm 50mV$.
6. If it is not within the range, readjust offset.
7. Disconnect short circuit IC1-14 and GND.

4. Sensor Position Adjustment (Fig. 4-54)

Adjust: Sensor Adjustment Screw

Observe: Monitor

1. Aim the camera at the resolution chart. (Set the power switch of light box to OFF position.)
2. Move the object 3m away from the camera lens.
3. Adjust the Sensor Adjustment Screw for optimum focus of the monitored picture.

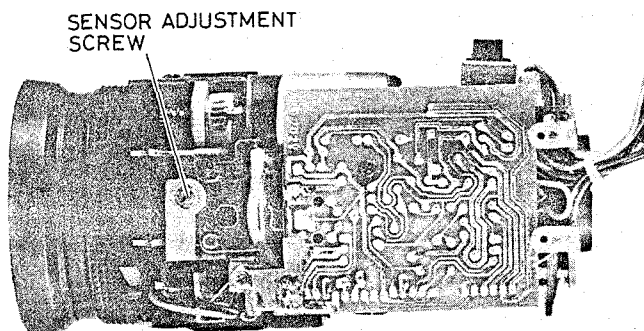


Fig. 4-54 Sensor Horizontal Position Adjustment

ADJUSTMENT PROCEDURE

Adjustment After Replacing Saticon

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. Target Voltage Adjustment
5. Beam Current Adjustment
6. Streaking Adjustment
7. Dark Shading Adjustment
8. Dark Offset Adjustment
9. AGC Maximum Gain Adjustment
10. AIC Level Adjustment
11. Backfocus Adjustment
12. Chroma Carrier Level Adjustment
13. Vertical Size Adjustment
14. Horizontal Size and Horizontal Linearity Adjustment
15. Horizontal Center and Vertical Center Adjustment
16. Chroma Setup Adjustment
17. R and B Signal Gain and Separation Adjustment
18. Focus Preset Adjustment
19. Dynamic Focus Preset Adjustment
20. R and B Signal Shading Preset Adjustment
21. R and B Signal Tracking Preset Adjustment
22. Focus Adjustment
23. Chroma Carrier Level Confirmation
24. Dynamic Focus Adjustment
25. R and B Signal Shading Adjustment
26. R and B Signal Tracking Adjustment
27. Burst Level Adjustment
28. Chroma Gain and Phase Adjustment
29. Low Light Chroma Gain Adjustment
30. White Balance Confirmation

Adjustment After Replacing Process Board

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. Dark Shading Adjustment
5. Dark Offset Adjustment
6. AGC Maximum Gain Adjustment
7. AIC Level Adjustment
8. Chroma Carrier Level Adjustment
9. Chroma Setup Adjustment
10. R and B Signal Gain and Separation Adjustment
11. Focus Preset Adjustment
12. Dynamic Focus Preset Adjustment
13. R and B Signal Shading Preset Adjustment
14. R and B Signal Tracking Preset Adjustment
15. Focus Adjustment
16. Chroma Carrier Level Confirmation
17. Dynamic Focus Adjustment
18. R and B Signal Shading Adjustment
19. R and B Signal Tracking Adjustment
20. Burst Level Adjustment
21. Chroma Gain and Phase Adjustment
22. Low Light Chroma Gain Adjustment
23. White Balance Confirmation

Adjustment After Replacing Deflection Board and Regulator Board

1. Dynamic Focus Release
2. R and B Signal Shading Release
3. R and B Signal Tracking Release
4. Target Voltage Adjustment
5. Beam Current Adjustment
6. Dark Shading Adjustment
7. Dark Offset Adjustment
8. AIC Level Adjustment
9. Backfocus Adjustment
10. Chroma Carrier Level Adjustment
11. Vertical Size Adjustment
12. Horizontal Size and Horizontal Linearity Adjustment
13. Horizontal Center and Vertical Center Adjustment
14. Chroma Setup Adjustment
15. R and B Signal Gain and Separation Adjustment
16. Focus Preset Adjustment
17. Dynamic Focus Preset Adjustment
18. R and B Signal Shading Preset Adjustment
19. R and B Signal Tracking Preset Adjustment
20. Focus Adjustment
21. Chroma Carrier Level Confirmation
22. Dynamic Focus Adjustment
23. R and B Signal Shading Adjustment
24. R and B Signal Tracking Adjustment
25. Burst Level Adjustment
26. Chroma Gain and Phase Adjustment
27. Low Light Chroma Gain Adjustment
28. White Balance Confirmation

COMPONENT BOARDS LOCATION AND IDENTIFICATION

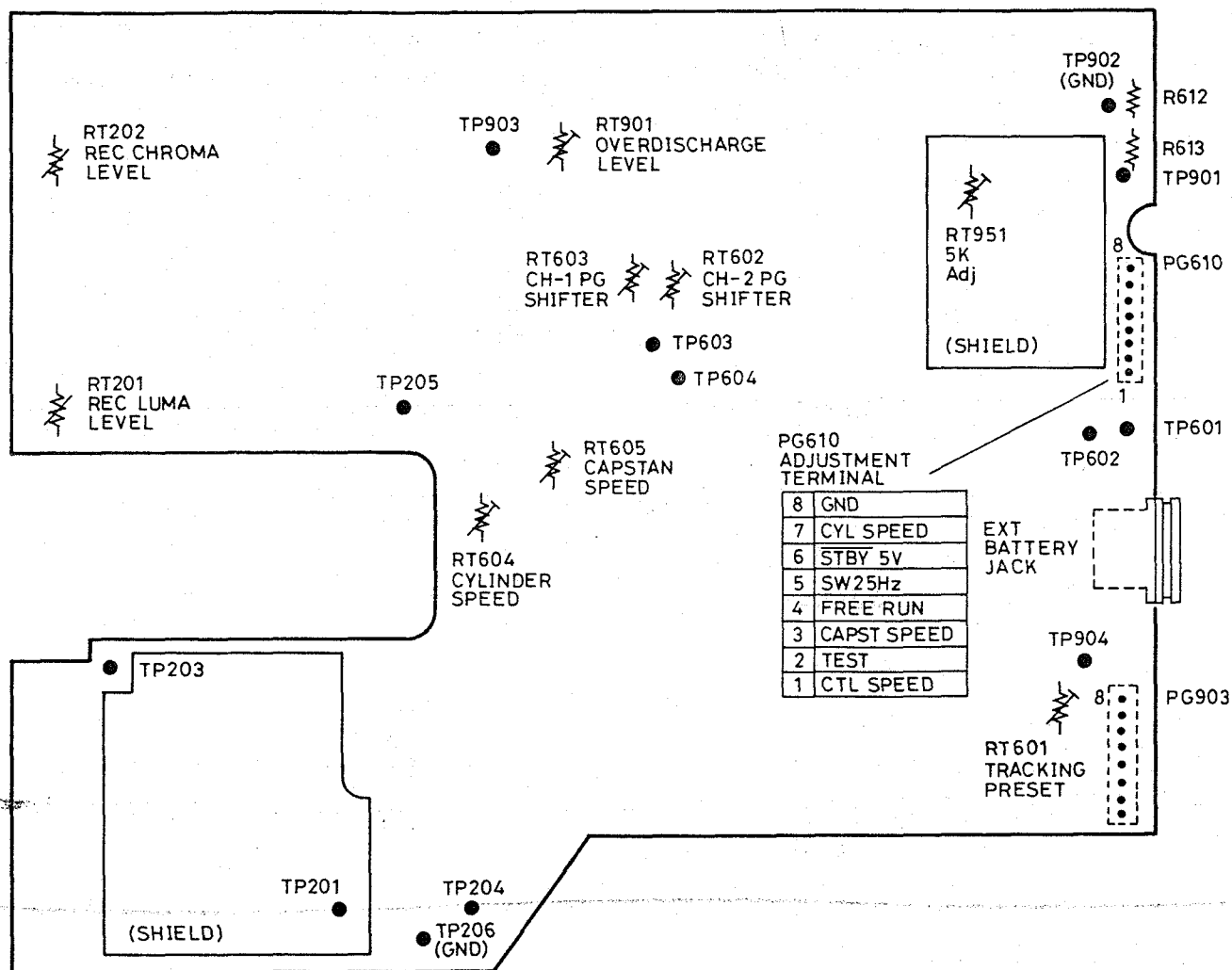


Fig. 4-101 Main Circuit Board (Solder Side)

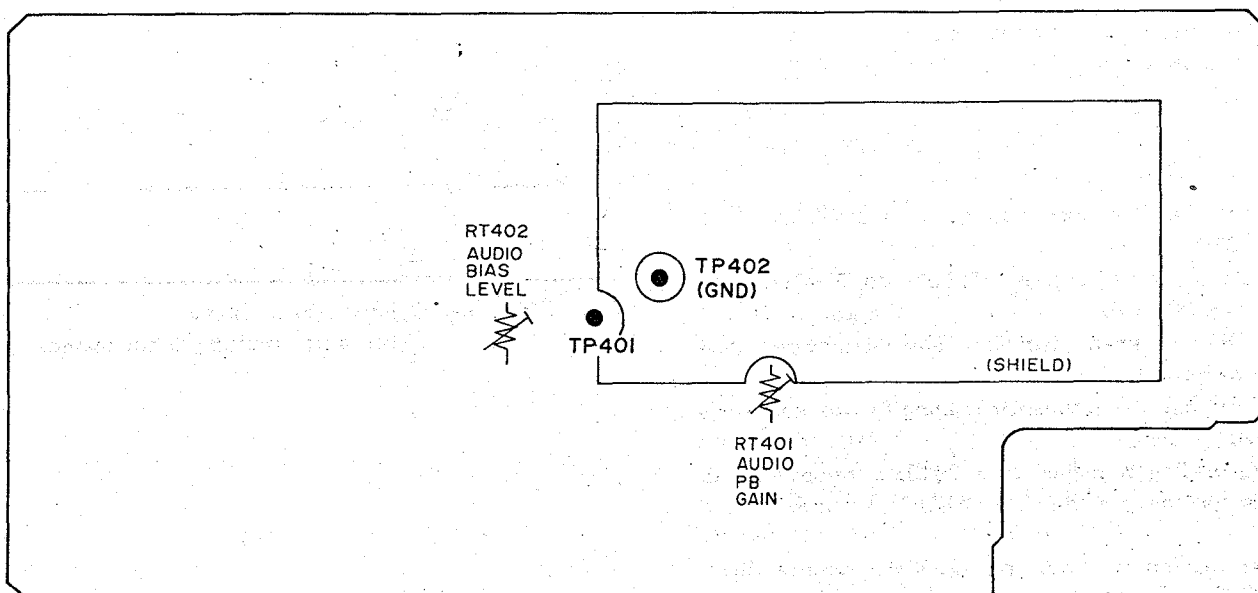


Fig. 4-102 Audio Circuit Board (Solder Side)

VTR SECTION

MAIN CIRCUIT (SWITCHING REGULATOR SECTION)

5V Adjustment (Fig. 4-101)

This adjustment sets the output voltage of the 5V Regulator precisely to 5V as the main power supply for the circuit.

Test Point: TP901 (5V) Main
Adjust: RT951 (5V Adj) Main

1. Apply the DC12V to the EXT battery jack.
2. Place the instrument in the "Record" mode.
3. Connect the DVM to TP901.
4. Adjust the 5V Adj control (RT951) for $5.3V \pm 0.05V$ DC.

Overdischarge Level Adjustment (Fig. 4-101)

This adjustment determines the overdischarge detection level. When the battery voltage drops to a specified level, the VTR will automatically shut off.

When the overdischarge detection level is set below 11.5V the battery service life will deteriorate. Conversely, when the voltage is adjusted higher than 11.6V the usable time per charge is shortened.

Observe: BATTERY display Left Side
Adjust: RT901 (OVERDISCHARGE LEVEL) Main

1. Turn the OVERDISCHARGE LEVEL control (RT901) fully counterclockwise.
2. Apply the $DC11.6V \pm 10mV$ to the EXT battery jack terminal.
3. Place the instrument in the "Record" mode.
4. Turn the OVERDISCHARGE LEVEL control (RT901) clockwise until center and right (F) displays go off.

MAIN CIRCUIT (SERVO SECTION)

Reference Frequency Adjustment (Fig. 4-101)

This reference frequency is used to correct for fluctuations caused by unevenness between the belt, pulley, capstan motor and capstan shaft.

Test Point: AUDIO OUTPUT (PG903-6) Main
Adjust: RT613 Main
RT614

1. Connect the frequency counter to AUDIO OUTPUT (PG903-6).
2. Connect a jumper between TP602 and TP901 on the main circuit board.
3. Load the instrument with an alignment tape and playback the 3kHz audio signal.
4. Confirm that the frequency reading on the counter is $3000Hz \pm 15Hz$.
5. If the reading is higher than 3015Hz, remove R613. Check for the presence of R612. If not present, add R612.
6. If the reading is lower than 2985Hz, remove R612. Check for the presence of R613. If not present, add R613.
7. Remove the jumper.

Cylinder Motor Speed Adjustment (Figs. 4-101, 4-103, 4-104)

This adjustment locks the cylinder servo to the system signal and maintains a constant cylinder speed of 2700 rpm. When not adjusted properly, horizontal stability is degraded and/or picture noise increases.

Test Point: TP603 (CYLINDER SPEED) Main
Adjust: RT604 (CYLINDER SPEED) Main

1. Connect the oscilloscope to TP603. (0.5V/5msec.cm)
2. Load the instrument with a blank tape and place the instrument in the "Record" mode.
3. Connect the jumper between TP601 and TP901 to release the cylinder phase control.
4. Adjust the CYLINDER MOTOR SPEED control (RT604) so that the sampling pulse stands still or moves slowly on the cylinder tach pulse. (See Fig. 4-103)
5. Remove the jumper between TP601 and TP901 and confirm the sampling pulse is locked in on the trailing edge of the cylinder tach pulse. (See Fig. 4-104)

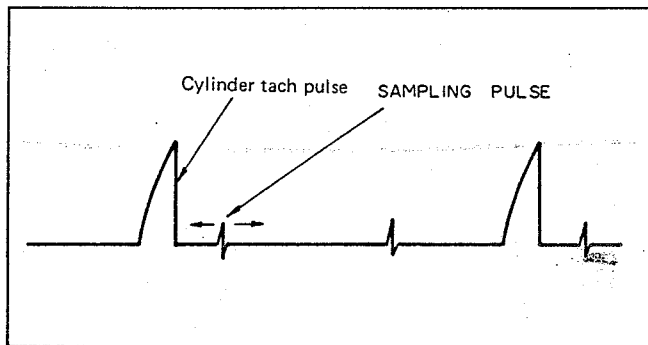


Fig. 4-103 Cylinder Motor Speed (During short circuiting)

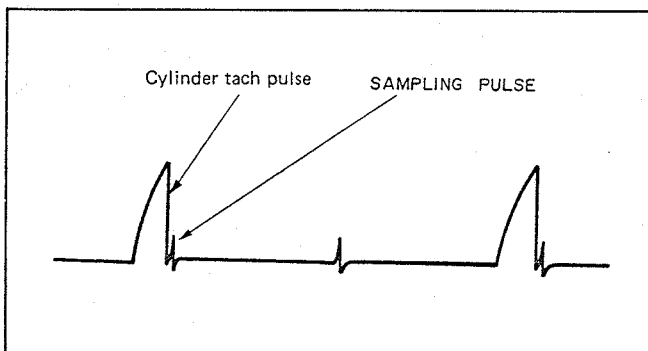


Fig. 4-104 Cylinder Motor Speed (With short-circuiting disconnected)

Capstan Motor Speed Adjustment

(Figs. 4-101, 4-105, 4-106)

This adjustment locks the capstan servo to the system signals and maintains a constant tape transport speed. When not adjusted properly, the vertical stability is degraded and/or the picture noise increases.

Test Point: TP604 (CAPSTAN MOTOR SPEED) Main

Adjust: RT605 (CAPSTAN MOTOR SPEED) Main

1. Apply a colour bar signal to EVF jack.
2. Connect the oscilloscope to TP604. (0.5V/5msec.cm)
3. Load the instrument with a blank tape and place the instrument in the "Record" mode.
4. Connect a jumper between TP601 and TP901 to release the capstan phase control.
5. Adjust the CAPSTAN MOTOR SPEED control (RT605) so that the sampling pulse stands still or moves slowly on the cylinder tach pulse. (See Fig. 4-105)
6. Remove the jumper between TP601 and TP901 and confirm the sampling pulse is locked in on the trailing edge of the cylinder tach pulse. (See Fig. 4-106)

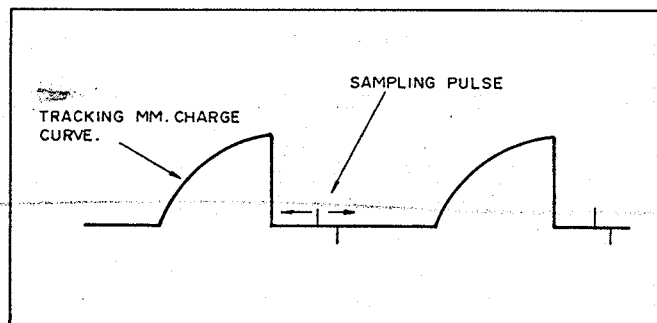


Fig. 4-105 Capstan Motor Speed (During short circuiting)

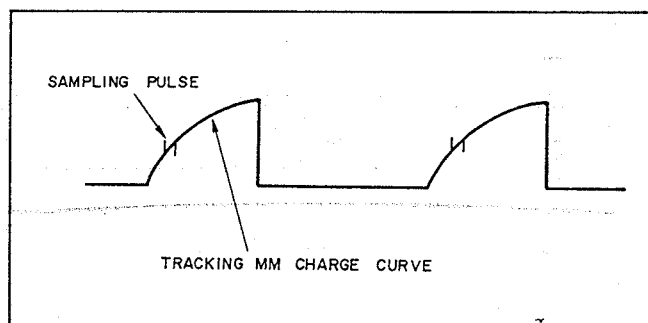


Fig. 4-106 Capstan Motor Speed
(With short-circuiting disconnected)

Head Switching Point Adjustment (Figs. 4-101, 4-107)

The pulse generator shifter determines the video head switching point during playback.

Misadjustment of PG Shifter may cause head switching noise in the picture and/or vertical.

Test Point: VIDEO OUT (TP904)

Main

Adjust: RT603 (CH-1 PG SHIFTER)

Main

RT602 (CH-2 PG SHIFTER)

Main

1. Load the instrument with an alignment tape and playback the colour bar signal.
2. Connect the oscilloscope to TP904. (2V/50μsec.cm)
3. Trigger the oscilloscope at SW 25Hz. (Use TP205 on the main circuit board.)
4. Set the oscilloscope to (-) slope and adjust the CH-1 PG SHIFTER (RT603) so that the leading edge of the SW 25Hz signal is placed 6.5H (horizontal) lines before the start of vertical sync.
5. Set the oscilloscope to (+) slope and adjust the CH-2 PG SHIFTER (RT602) so that the leading edge of the SW 25Hz signal is placed 6.5H (horizontal) lines before the start of vertical sync.

Note: The waveform of CH-1 and CH-2 video signals in the diagram may be opposite depending on the alignment tape.

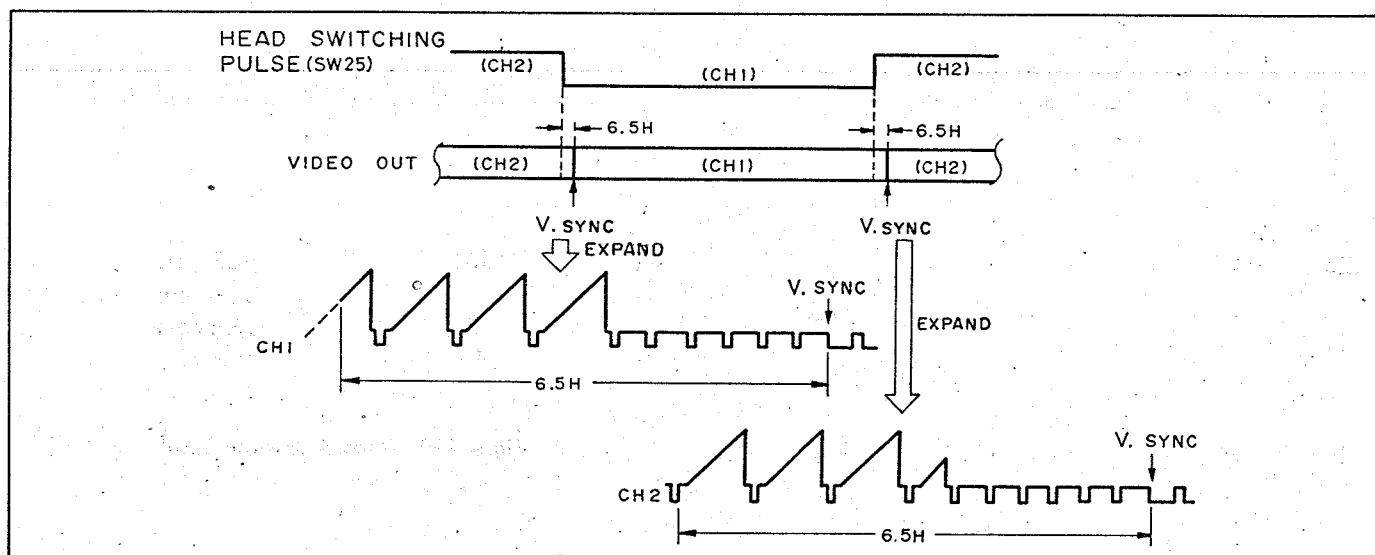


Fig. 4-107 Head Switching Point

MAIN CIRCUIT (LUMA/CHROMA SECTION)

Tracking Preset Adjustment (Figs. 4-101, 4-108)

This adjustment is performed to obtain tracking during playback of a tape recorded on the same instrument. When this adjustment is incomplete, noise may be conspicuous with the tracking control placed in the detent position or noise may not be removed by the tracking control.

Test Points: VIDEO OUT (TP904) Main
 TP604 (CAPSTAN SERVO) Main
 Adjust: RT601 (TRACKING PRESET) Main

1. Set the TRACKING control located on the left side to the mechanical centre (centre click) position.
2. Apply a colour bar signal to the EVF jack.
3. Using a blank tape, make a recording and playback.
4. Connect the Channel-1 of oscilloscope to TP904. (1V/0.5msec.cm)
5. Connect the channel-2 of oscilloscope to TP604. (0.5V/0.5msec.cm)
6. Trigger the oscilloscope at SW 25Hz. (Use TP205 on the main circuit board.)
7. Set the oscilloscope to (—) slope.
8. Adjust the TRACKING PRESET control (RT601) so that the CTL pulse and the vertical sync back porch of the video signal match.

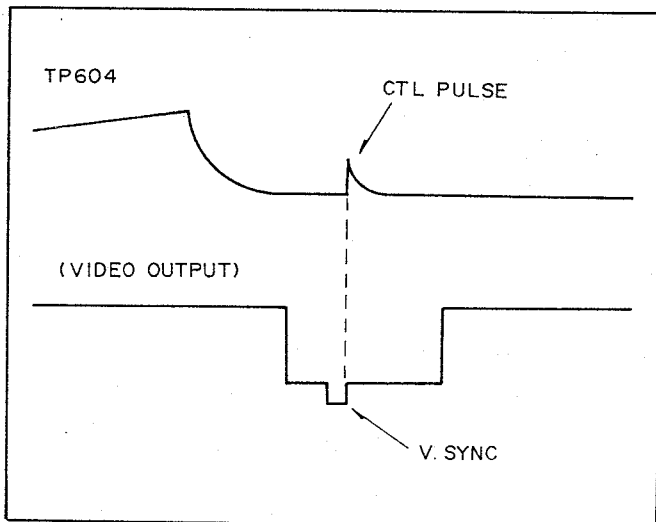


Fig. 4-108 Tracking Preset

Record Chroma Level Adjustment (Figs. 4-101, 4-109, 4-110, 4-111)

Optimum record colour level is regulated by this adjustment. If the record chroma level is too high, diamond beats can be seen in the screen. If the level is too low, the colour degraded.

Test Point: TP201 (REC CURRENT) Main
 Adjust: RT202 (REC CHROMA LEVEL) Main

1. Apply a colour bar signal to EVF jack.
2. Adjust the input colour bar signal level for 1Vp-p measured at the video input jack.
3. Connect the oscilloscope to TP201. (10mV/20μsec.cm)
4. Trigger the oscilloscope at 12.5 Hz. (Use TP204 on Main circuit board.)
5. Load the instrument with a blank tape and place in the "Record" mode.
6. Turn the REC LUMA LEVEL control (RT201) fully counterclockwise. (As seen from solder side.)
7. Check the upper cylinder for number stamped on the top. (See Fig. 4-109)
8. Adjust REC CHROMA LEVEL control (RT202) as shown in the chart. (See Figs. 4-110, 4-111)
9. Perform the record luma level adjustment.

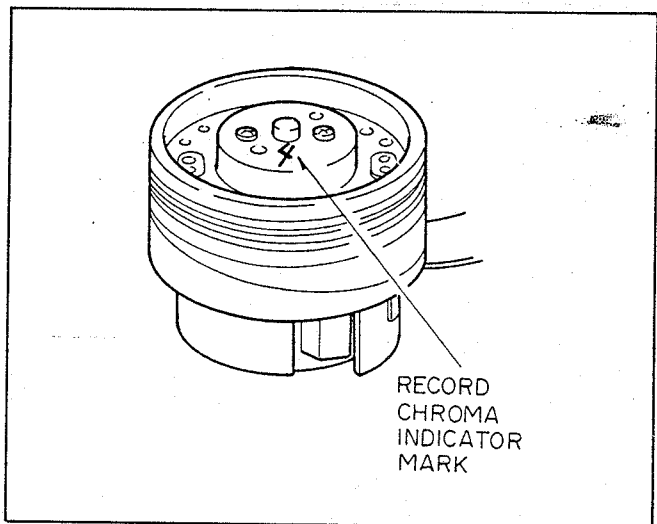


Fig. 4-109 Upper Cylinder Mark Location

MARK	LEVEL
0	30mVp-p
2	35mVp-p
4	40mVp-p

Fig. 4-110 Record Chroma Level

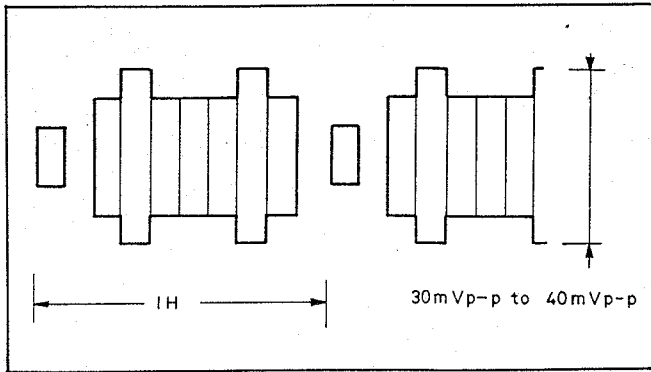


Fig. 4-111 Record Chroma Level

Record Luminance Level Adjustment (Figs. 4-101, 4-112)

Optimum record luma level is regulated by this adjustment. If the record luma level is too high, video may overload. If the level is too low, the S/N ratio deteriorate. Record chroma level should be set prior to adjusting the record luma level.

Test Point: TP201 (REC CURRENT) Main
Adjust: RT201 (REC LUMA LEVEL) Main

1. Apply a colour bar signal to EVF jack.
2. Adjust the input colour bar signal level for 1Vp-p measured at the video input jack.
3. Connect the oscilloscope to TP201. (50mV/20 μ sec.cm)
4. Load the instrument with a blank tape and place in the "Record" mode.
5. Adjust REC LUMA LEVEL control (RT201) for 130mVp-p $\pm$ 10mV.

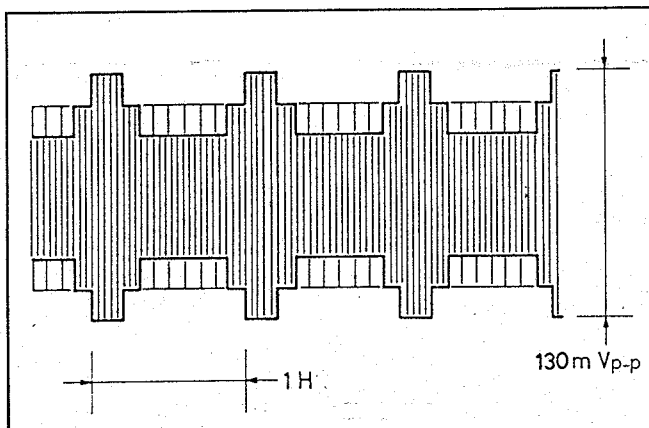


Fig. 4-112 Record Luminance Level

AUDIO CIRCUIT

Audio Playback Gain Adjustment

This adjustment sets the output level of the audio signal to the specified level.

Test Points: PG903-6 (AUDIO OUTPUT) Main
PG903-4 (AUDIO GND) Main
Adjust: RT401 (AUDIO PB GAIN) Audio

1. Connect the millivoltmeter to PG903-6. (Used GND PG903-4)
2. Load the instrument with an alignment tape and playback a 1kHz audio signal.
3. Adjust the AUDIO PB GAIN control (RT401) for 90mVrms.

Audio Bias Level Adjustment

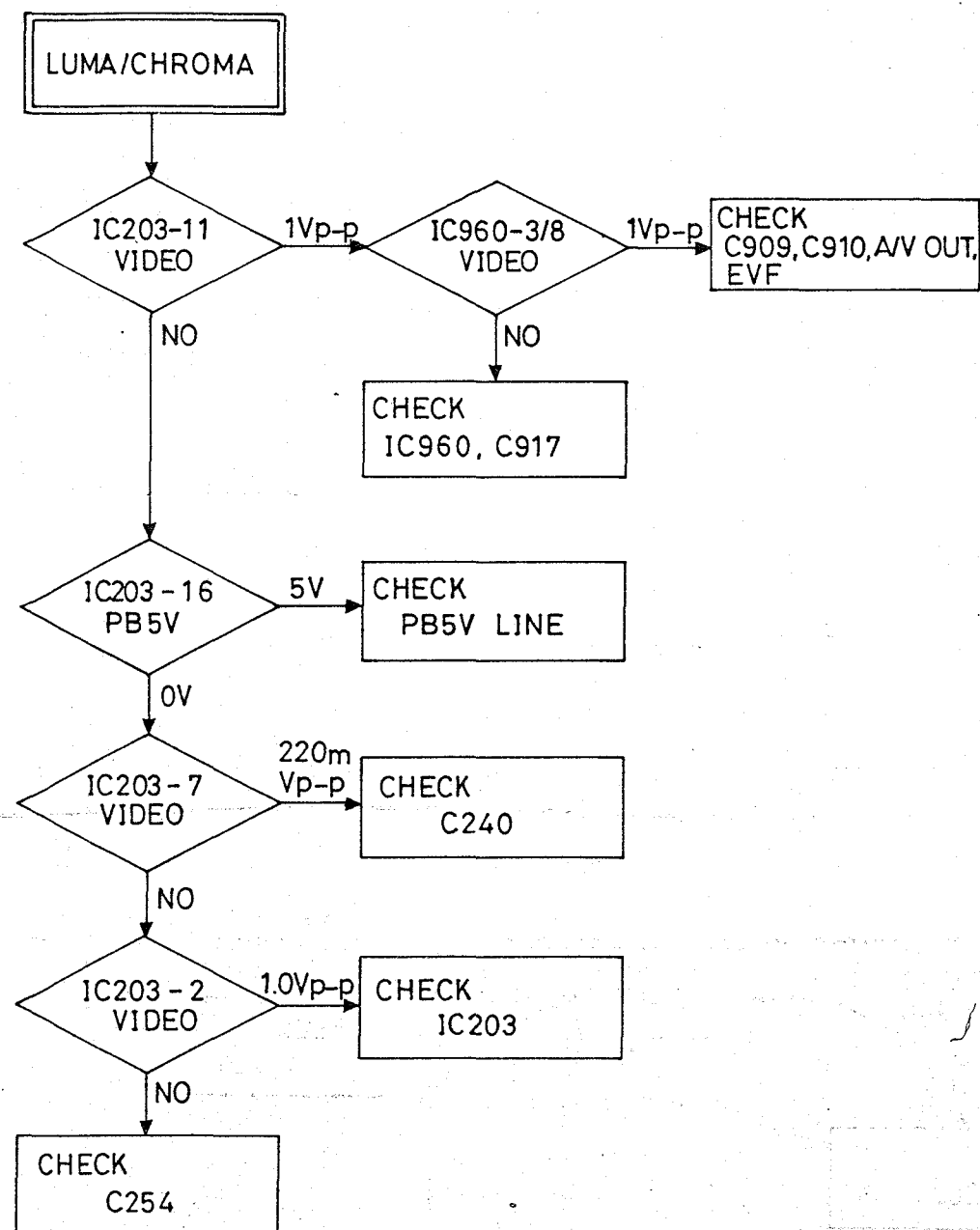
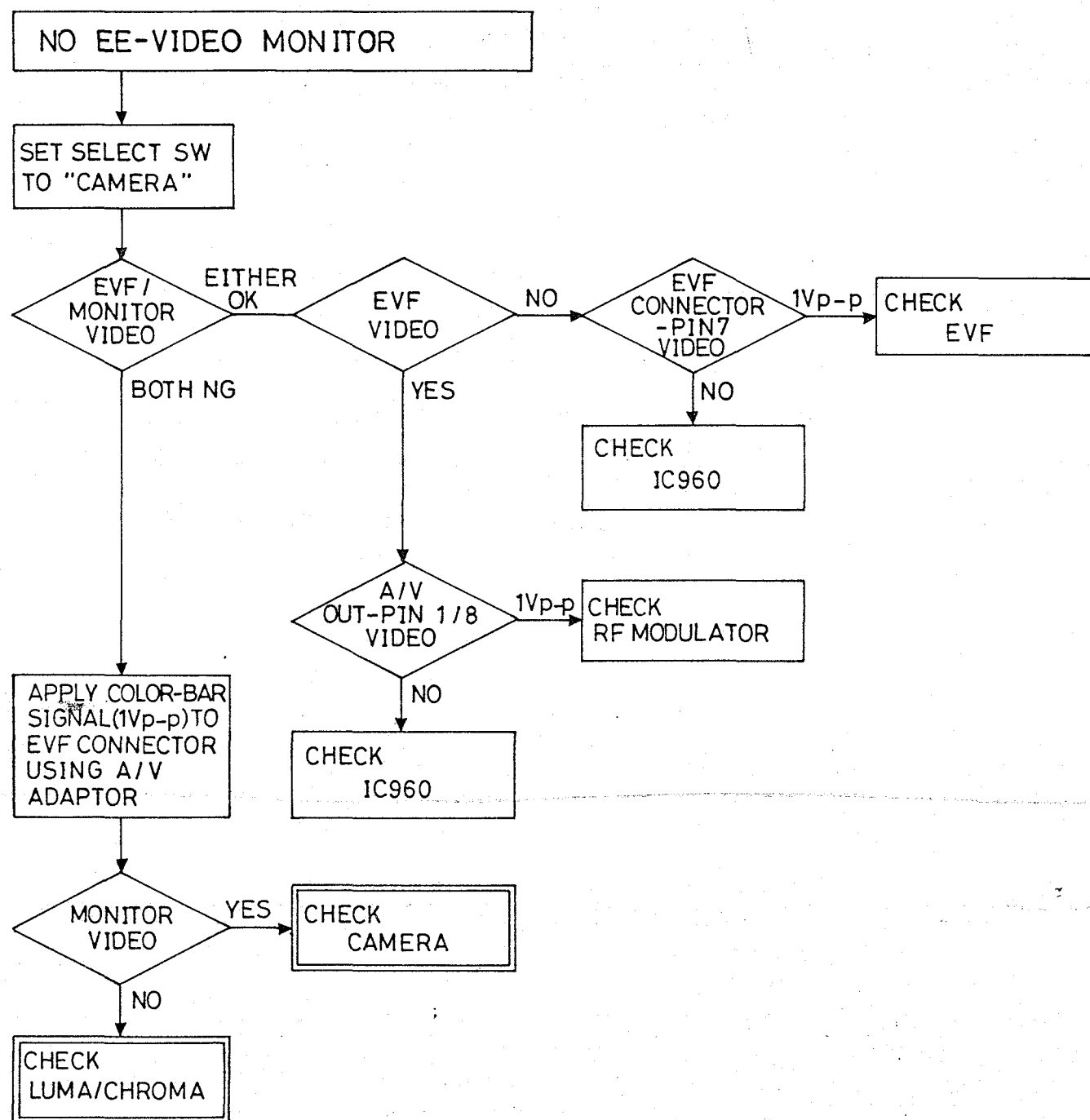
This adjustment optimizes the audio record bias. When the audio record bias is too low, high frequencies are increased resulting in distortion. When the level is too high, high frequencies are attenuated.

Test Points: TP401 (REC BIAS) Audio
TP402 (BIAS GND) Audio
Adjust: RT402 (AUDIO BIAS LEVEL) Audio

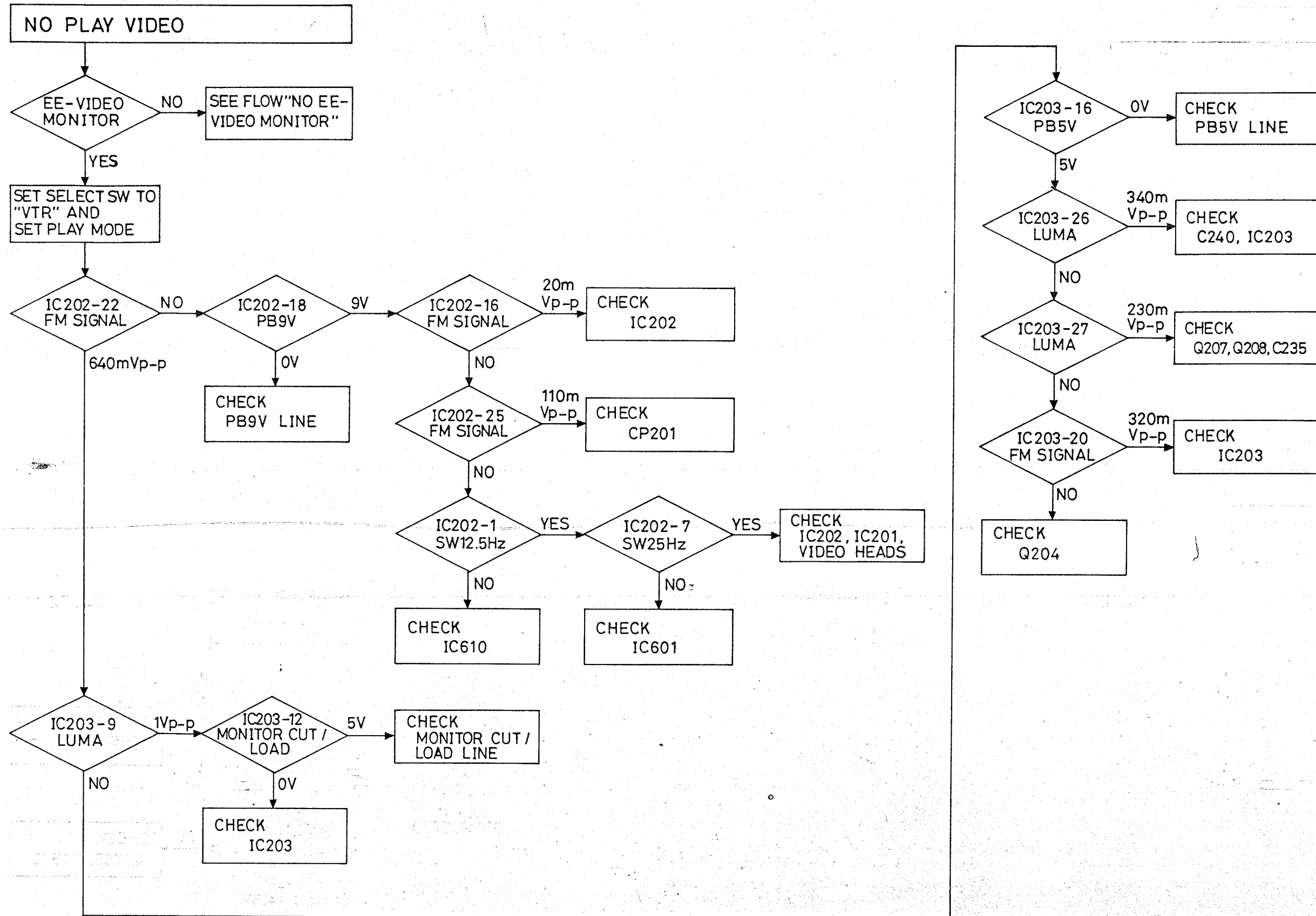
1. Connect the millivoltmeter to TP401. (Used GND TP402)
2. Load the instrument with a blank tape and place in the "Record" mode.
3. Adjust AUDIO BIAS LEVEL control (RT402) for 2.6mV $\pm$ 0.1mVrms.

MEMO

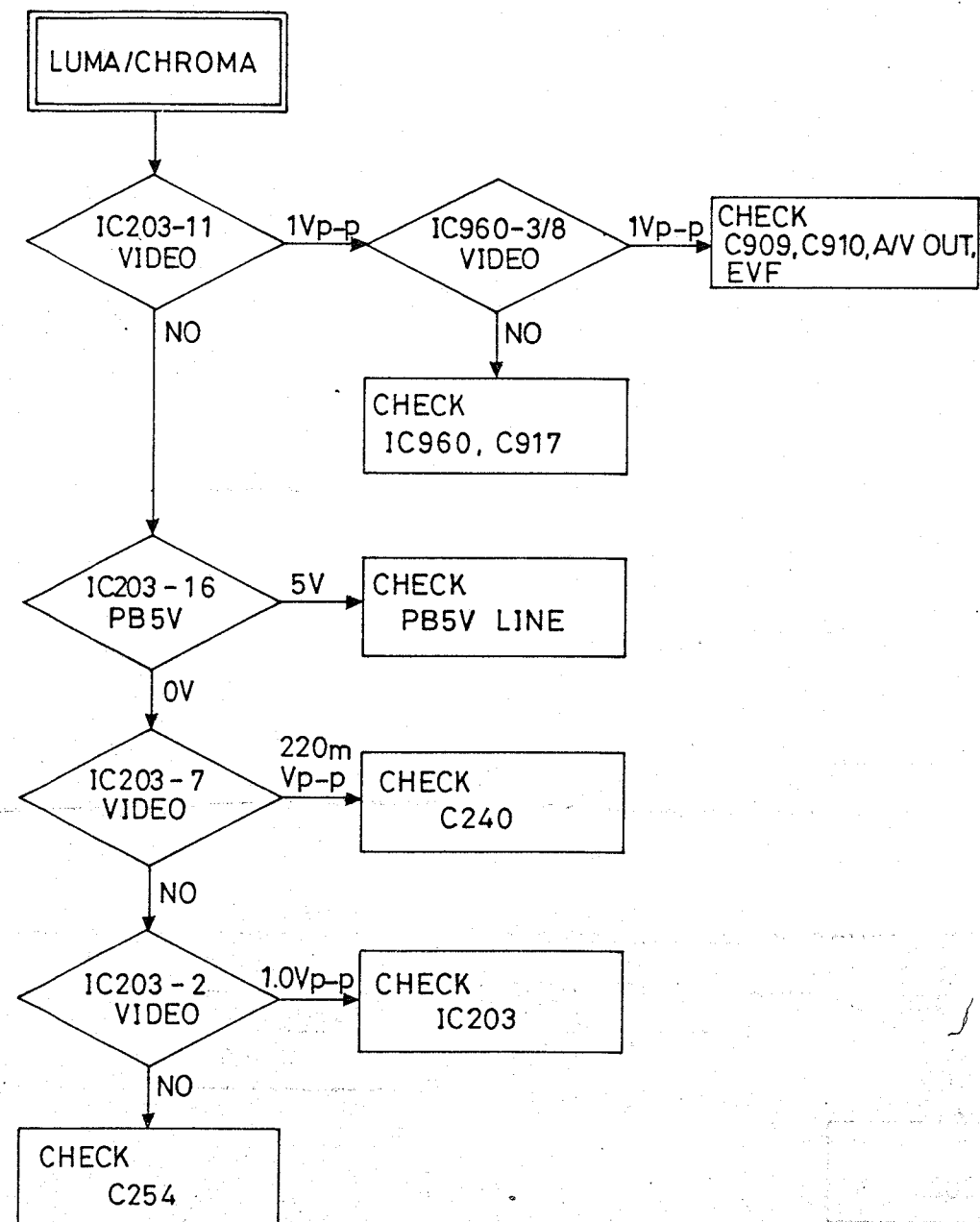
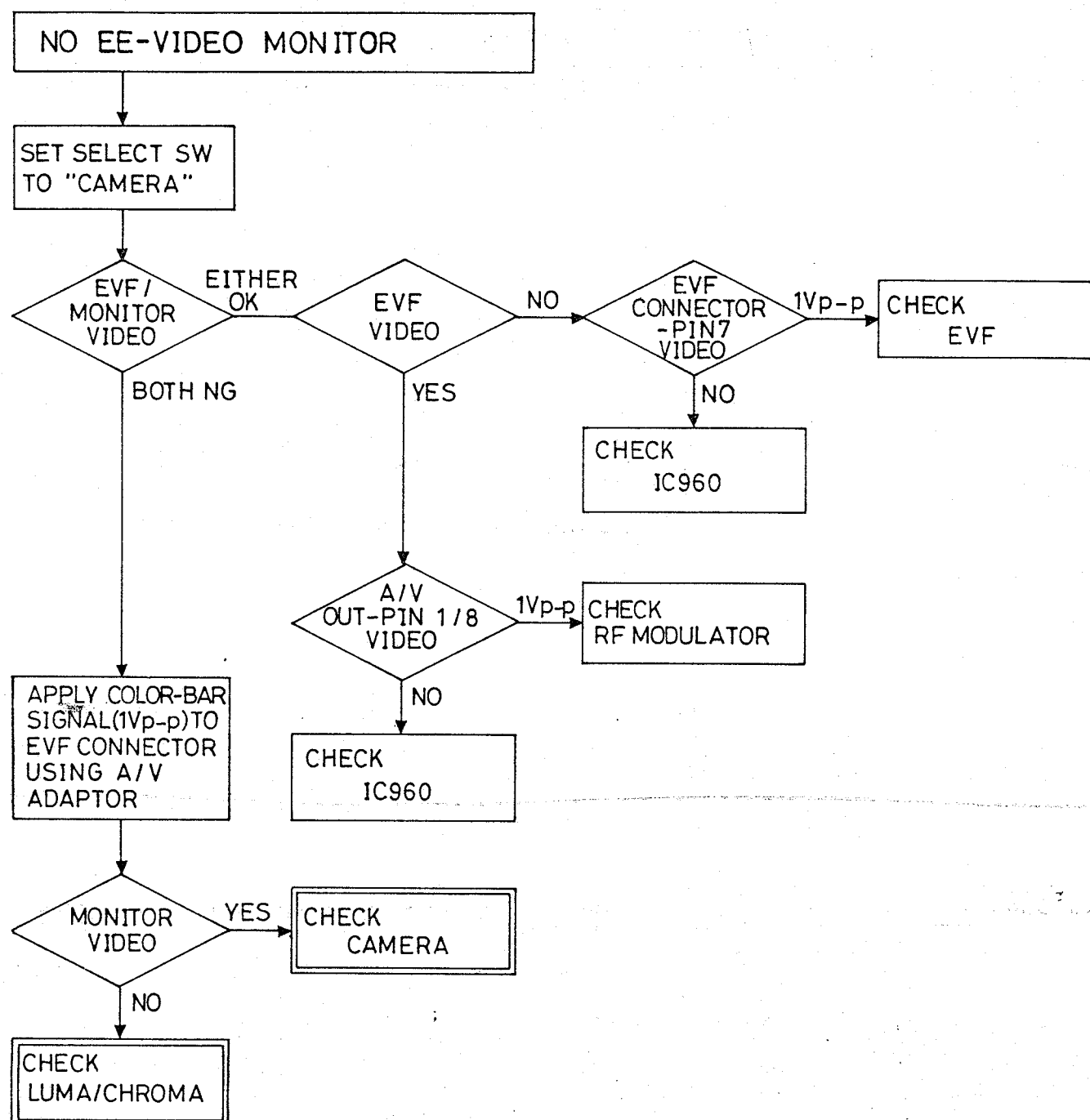
1. No EE-video monitor



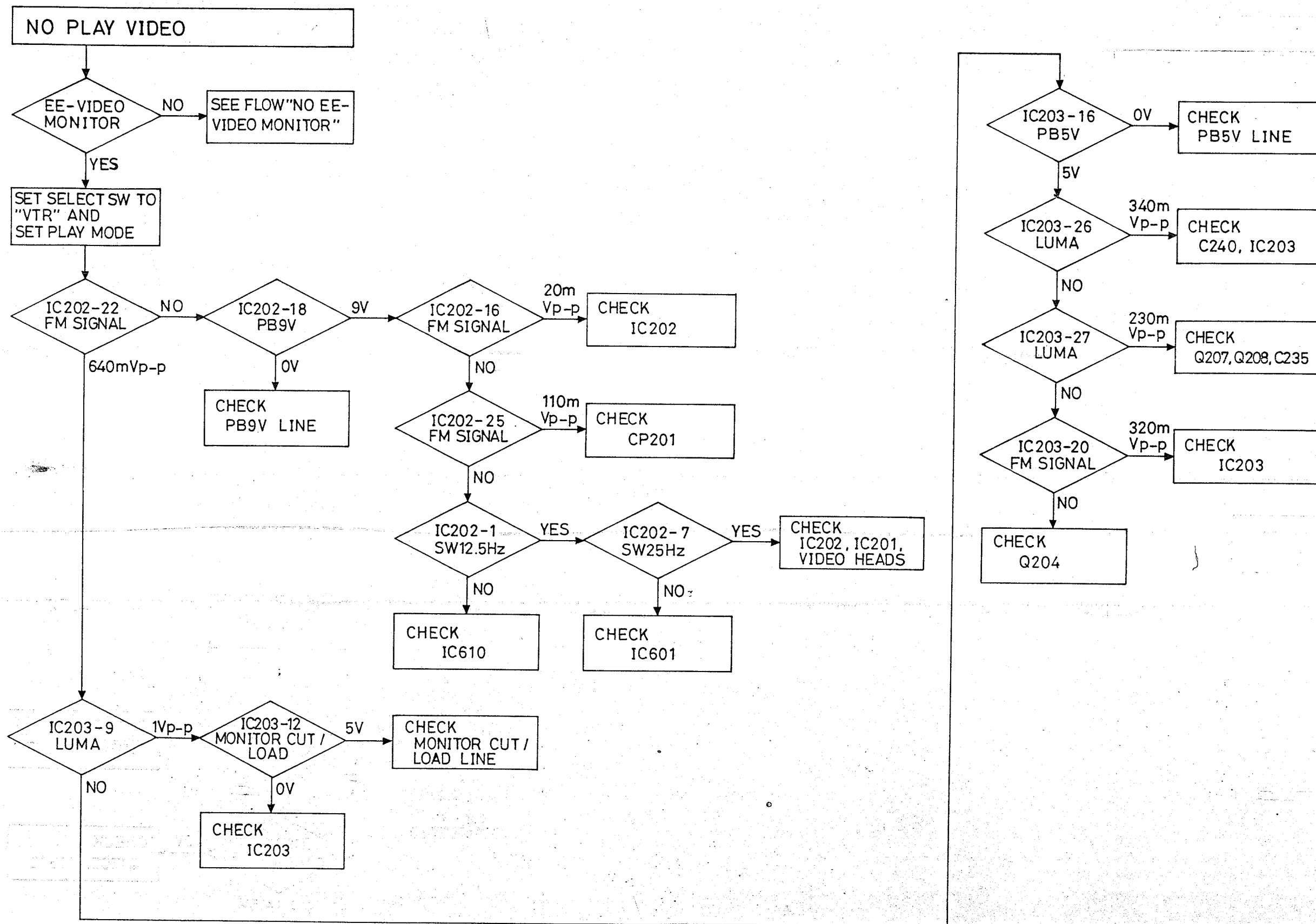
4. No play video



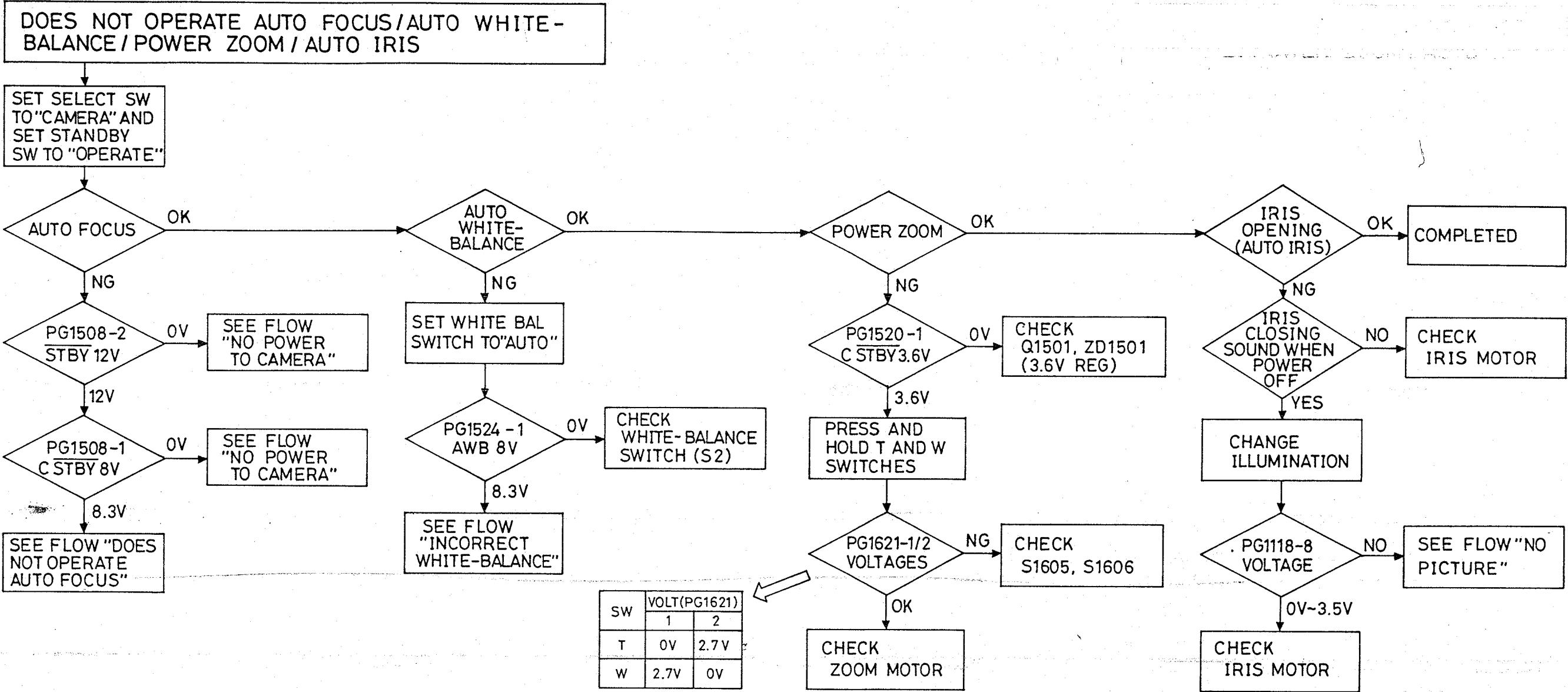
1. No EE-video monitor



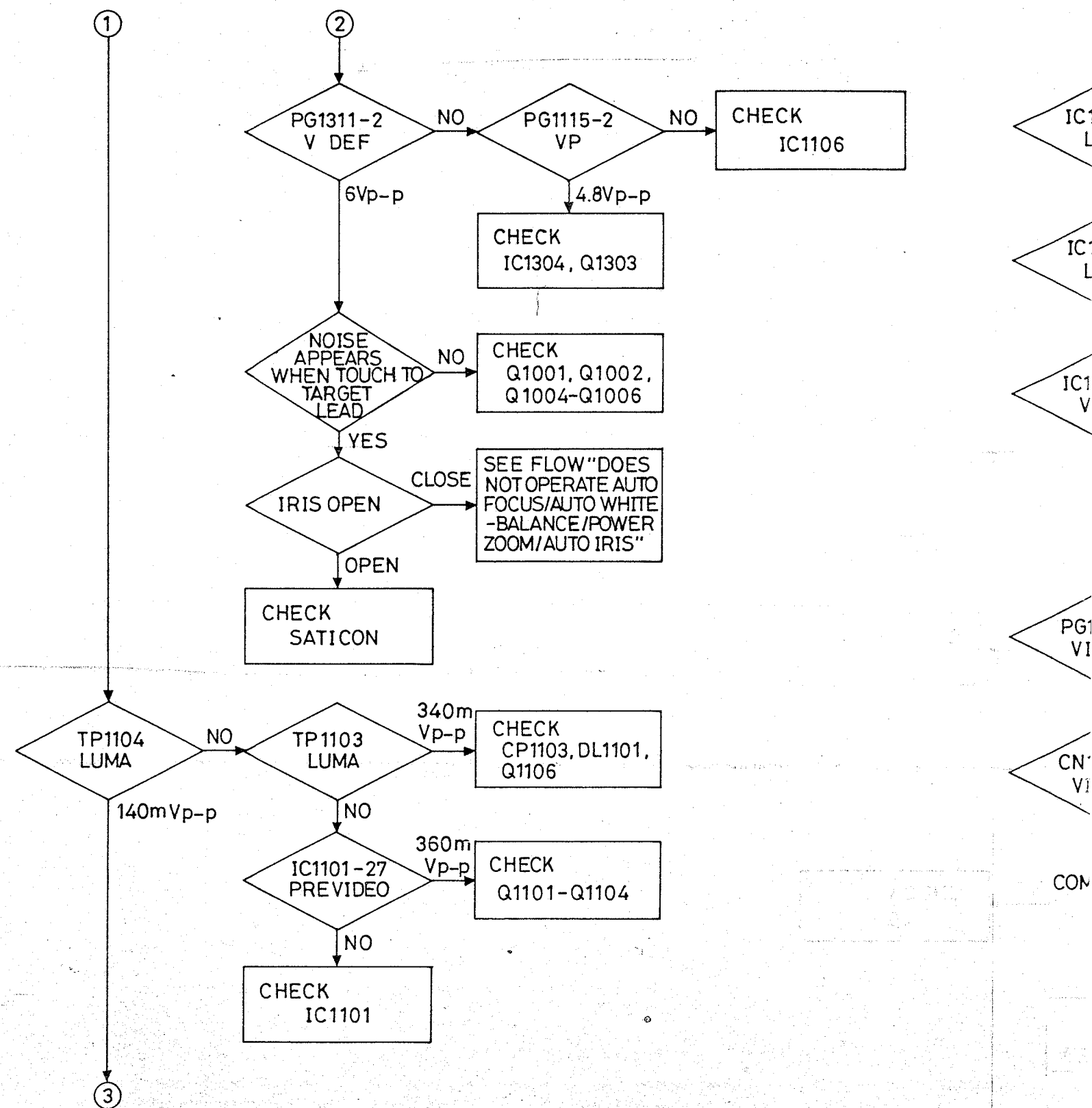
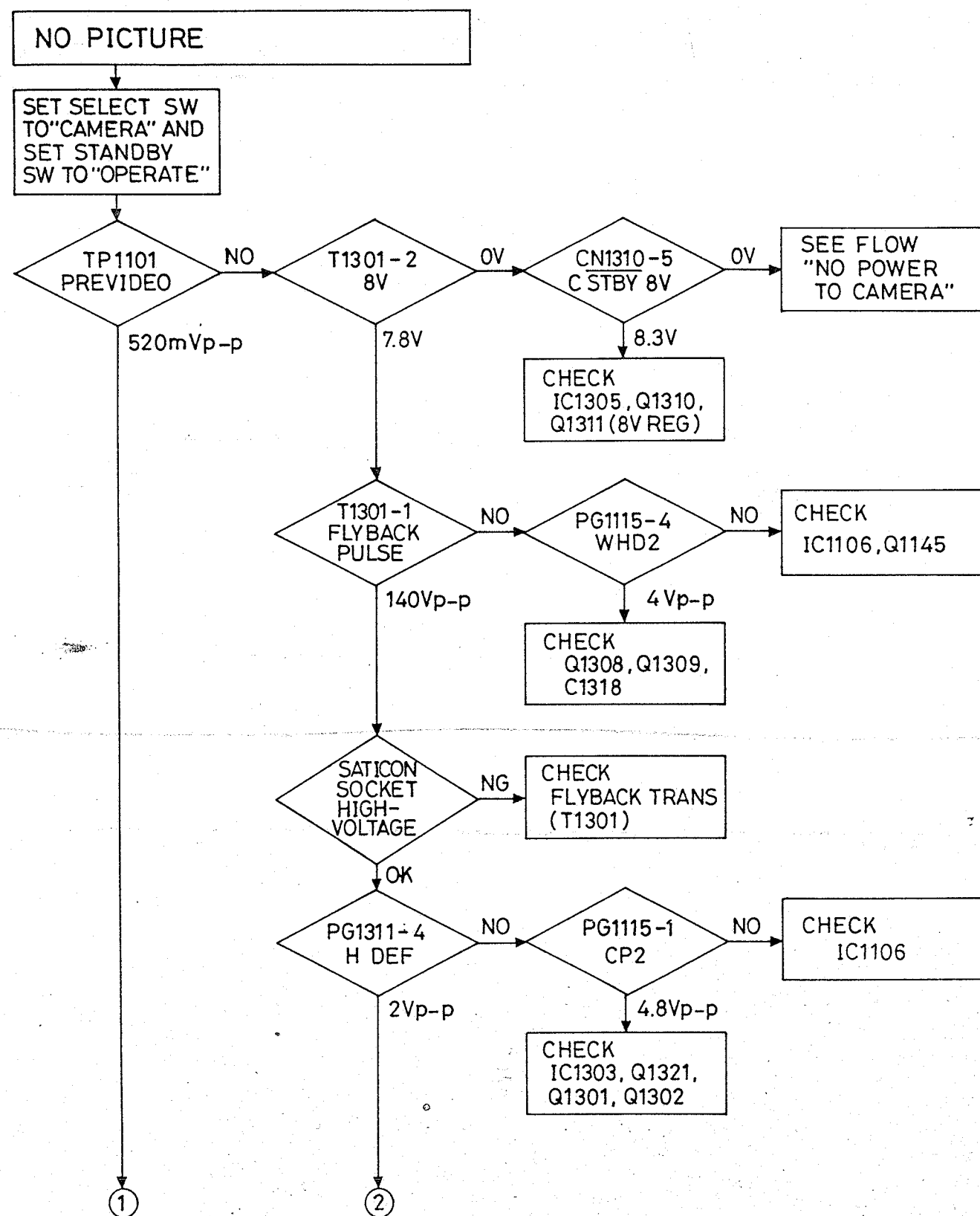
4. No play video



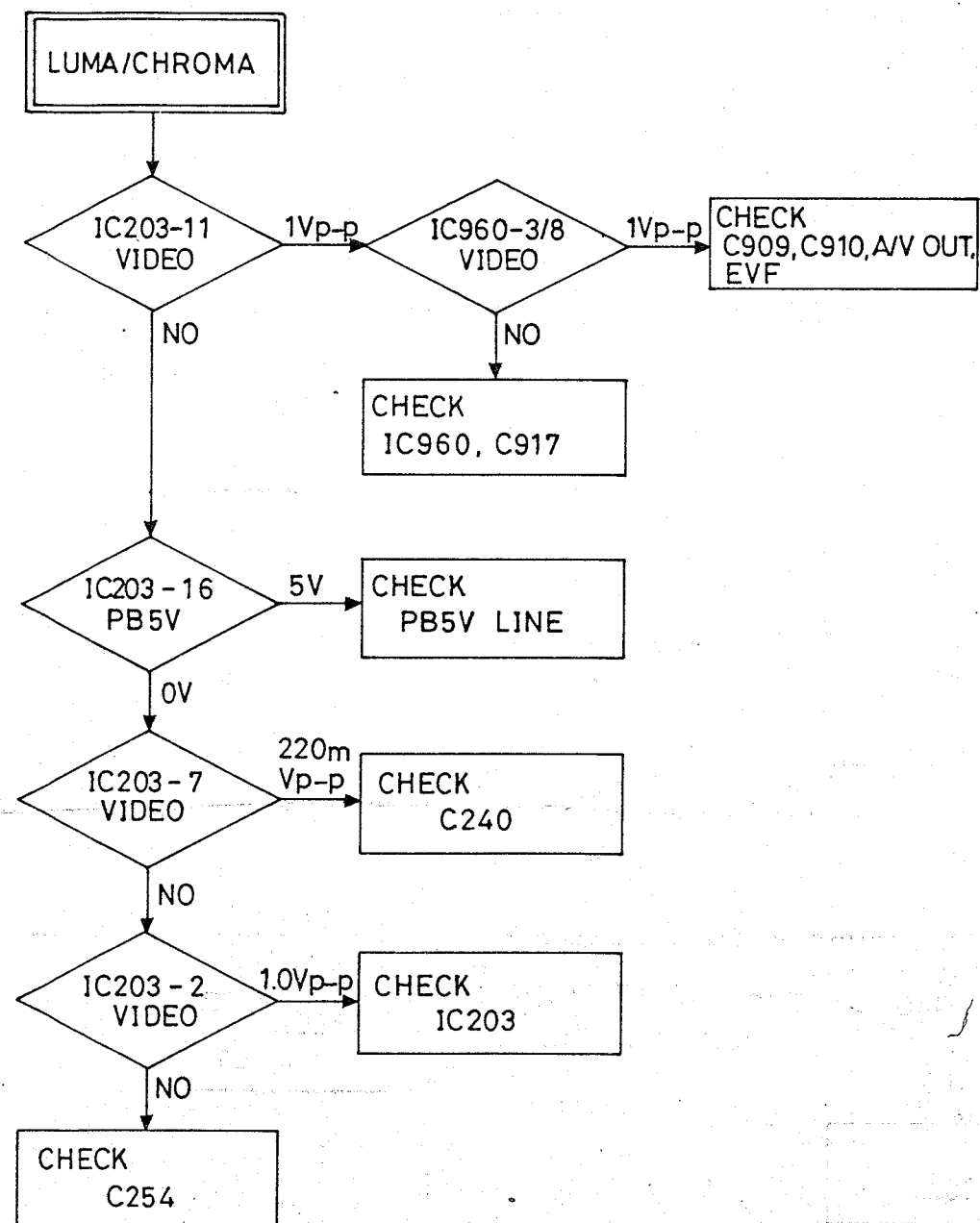
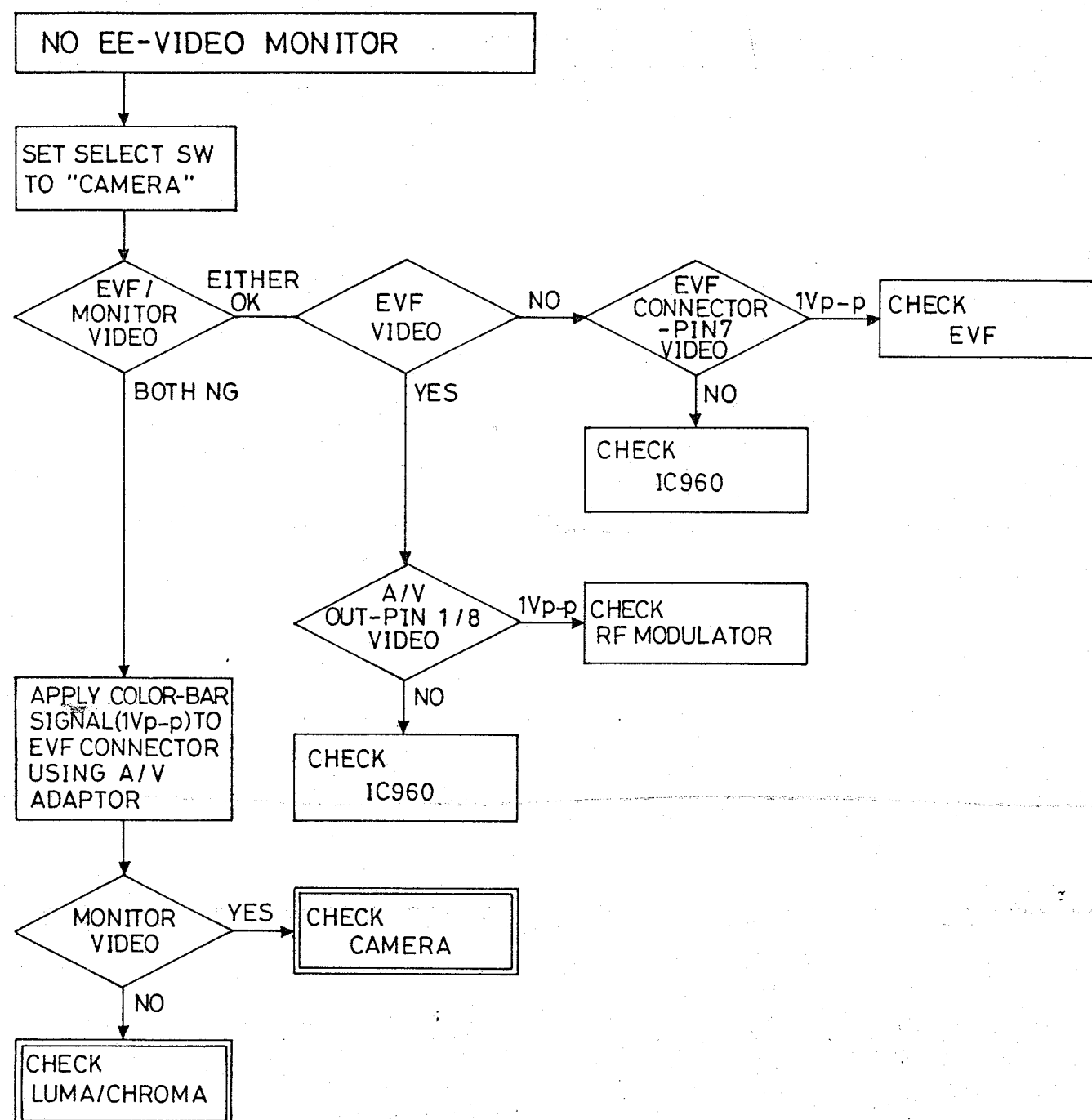
7. Does not operate auto focus/auto white-balance/power zoom/auto iris



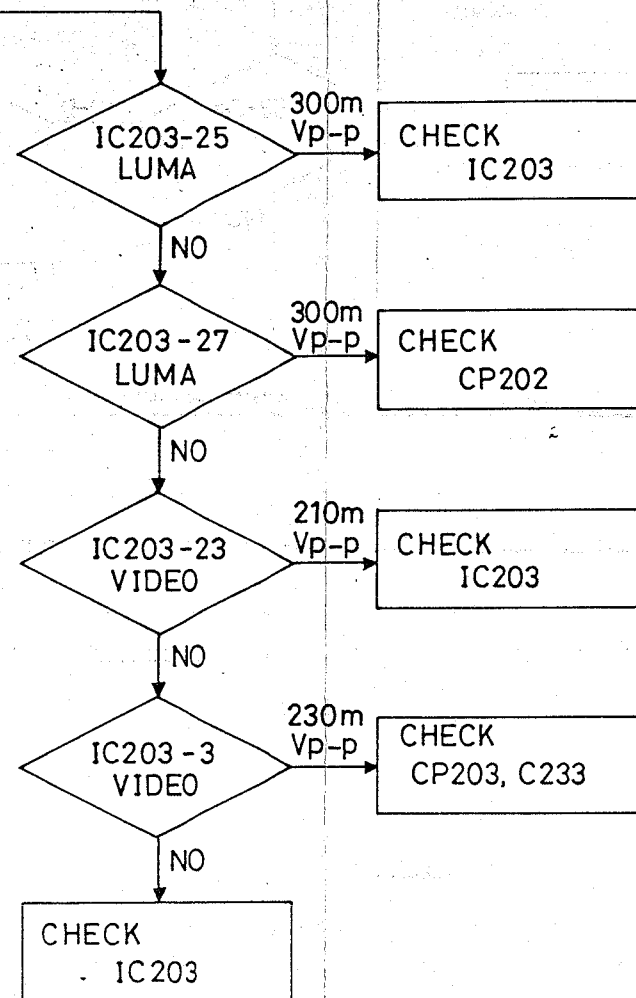
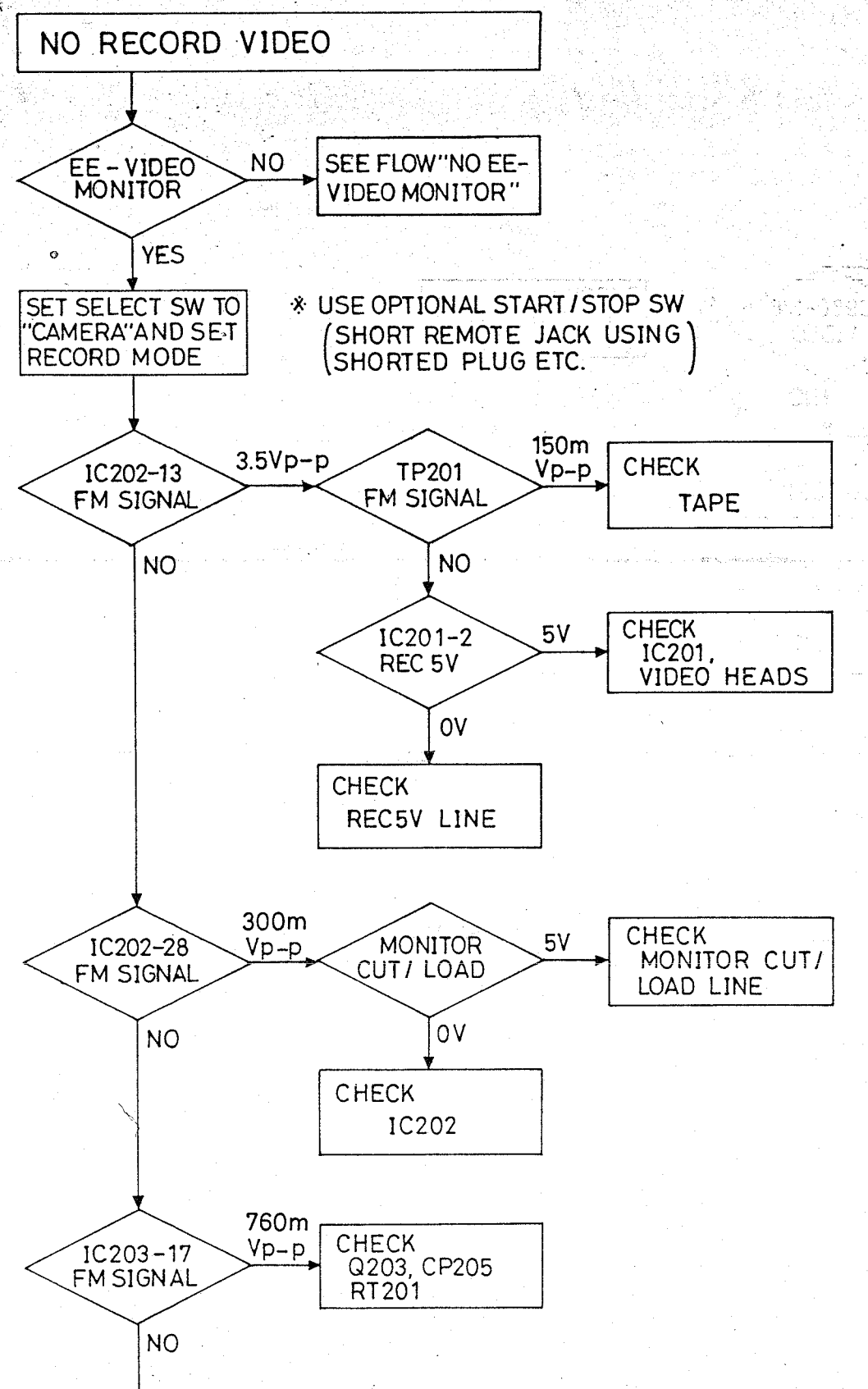
9. No picture



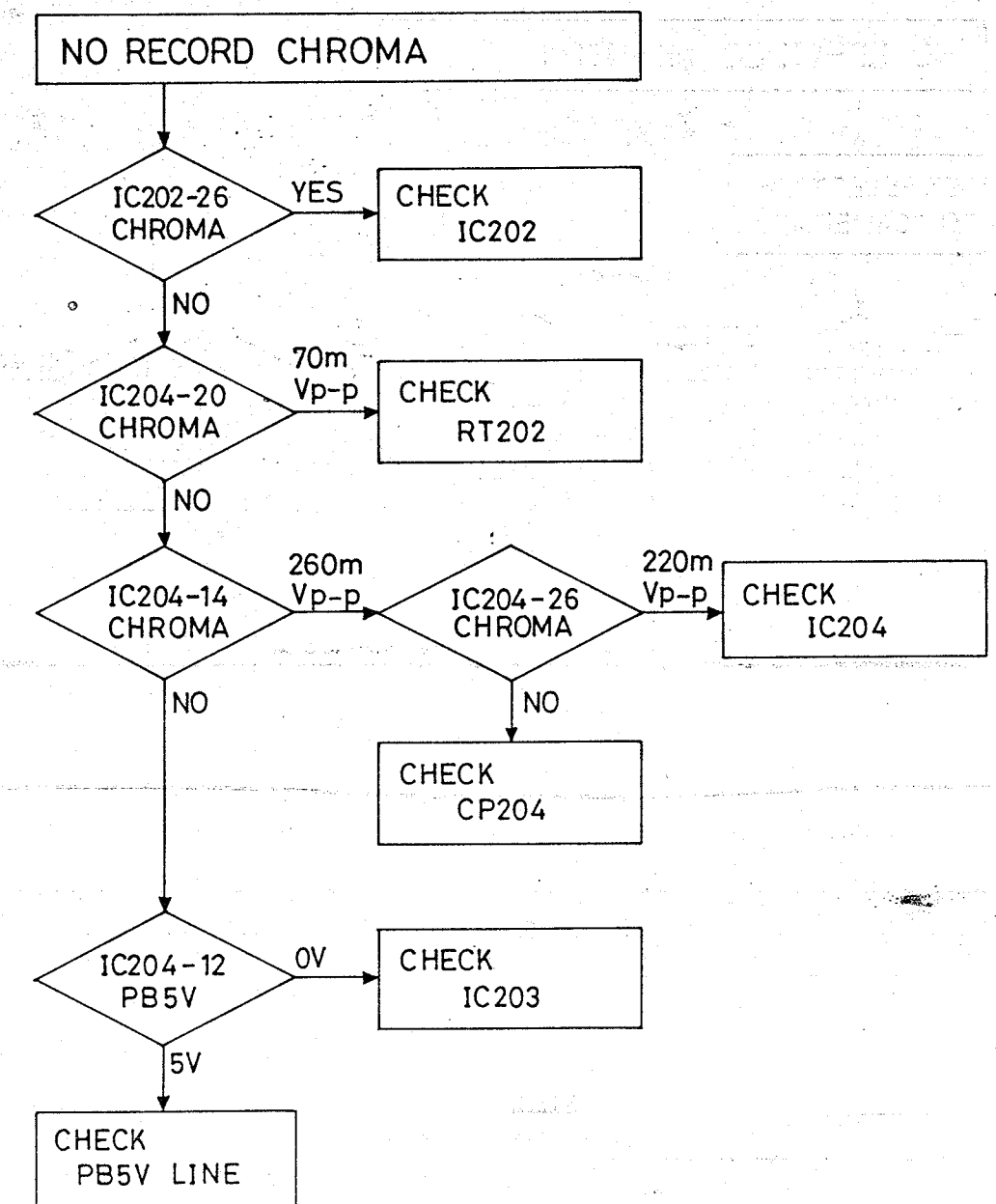
1. No EE-video monitor



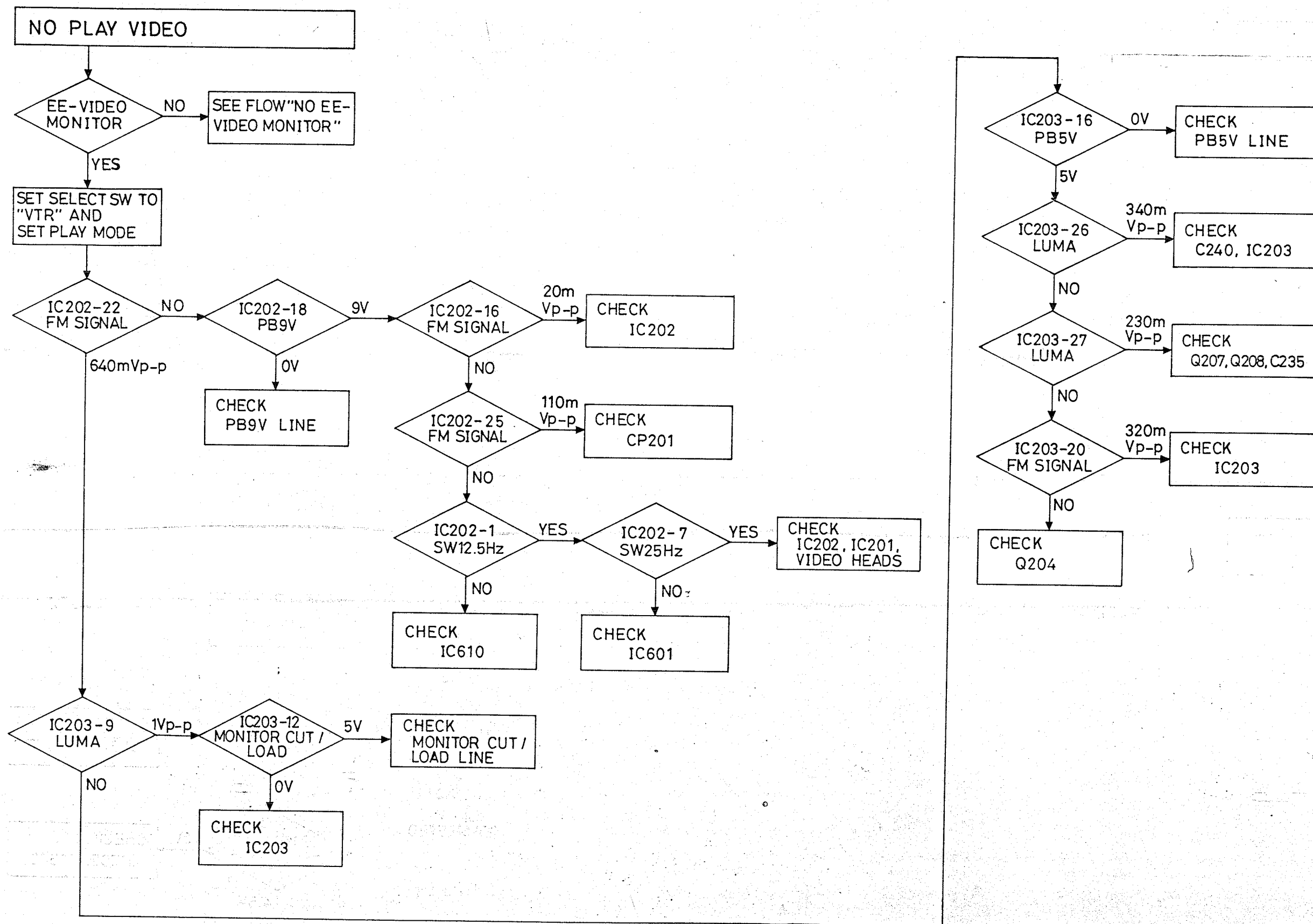
2. No record video



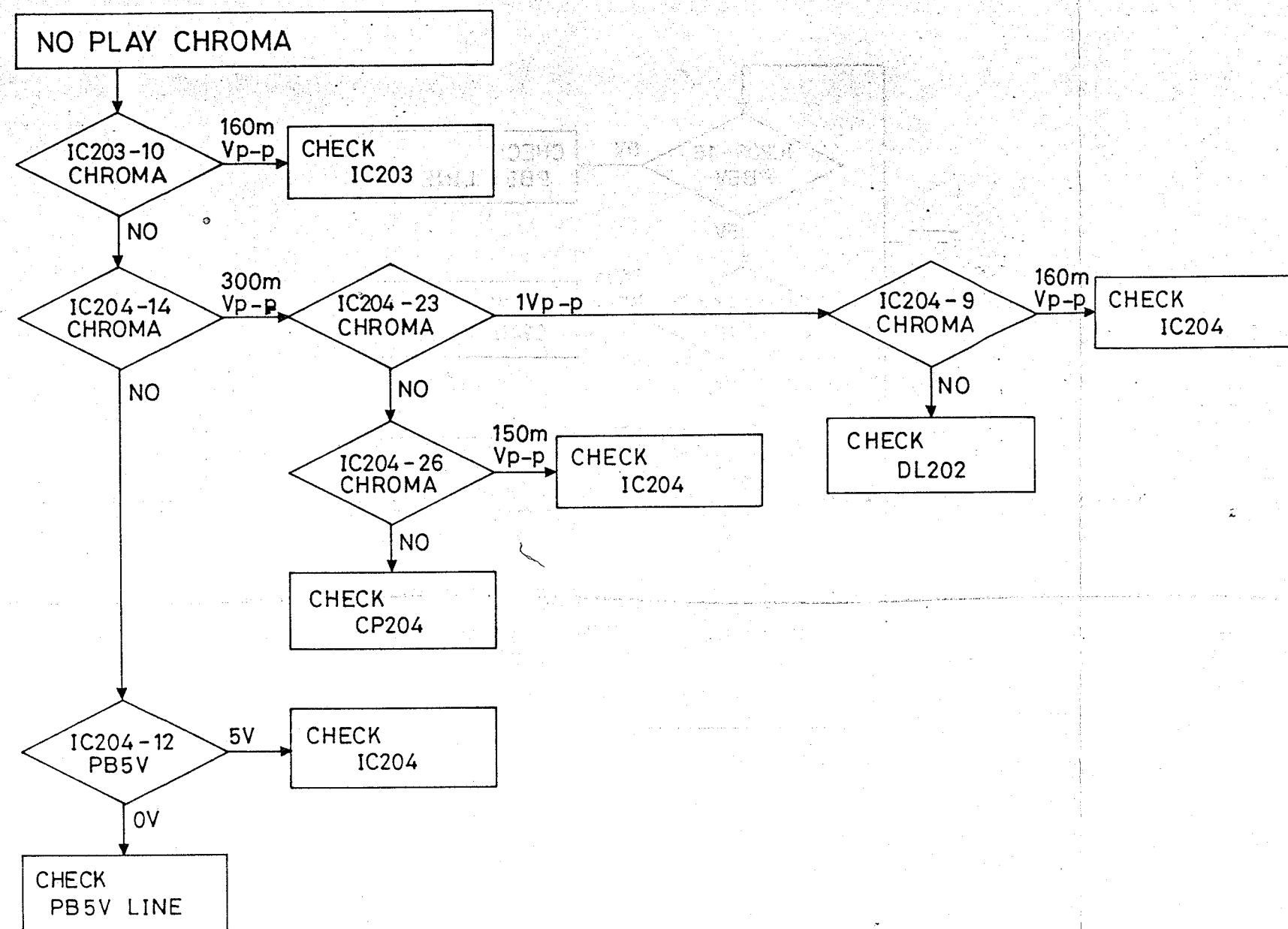
3. No record camera



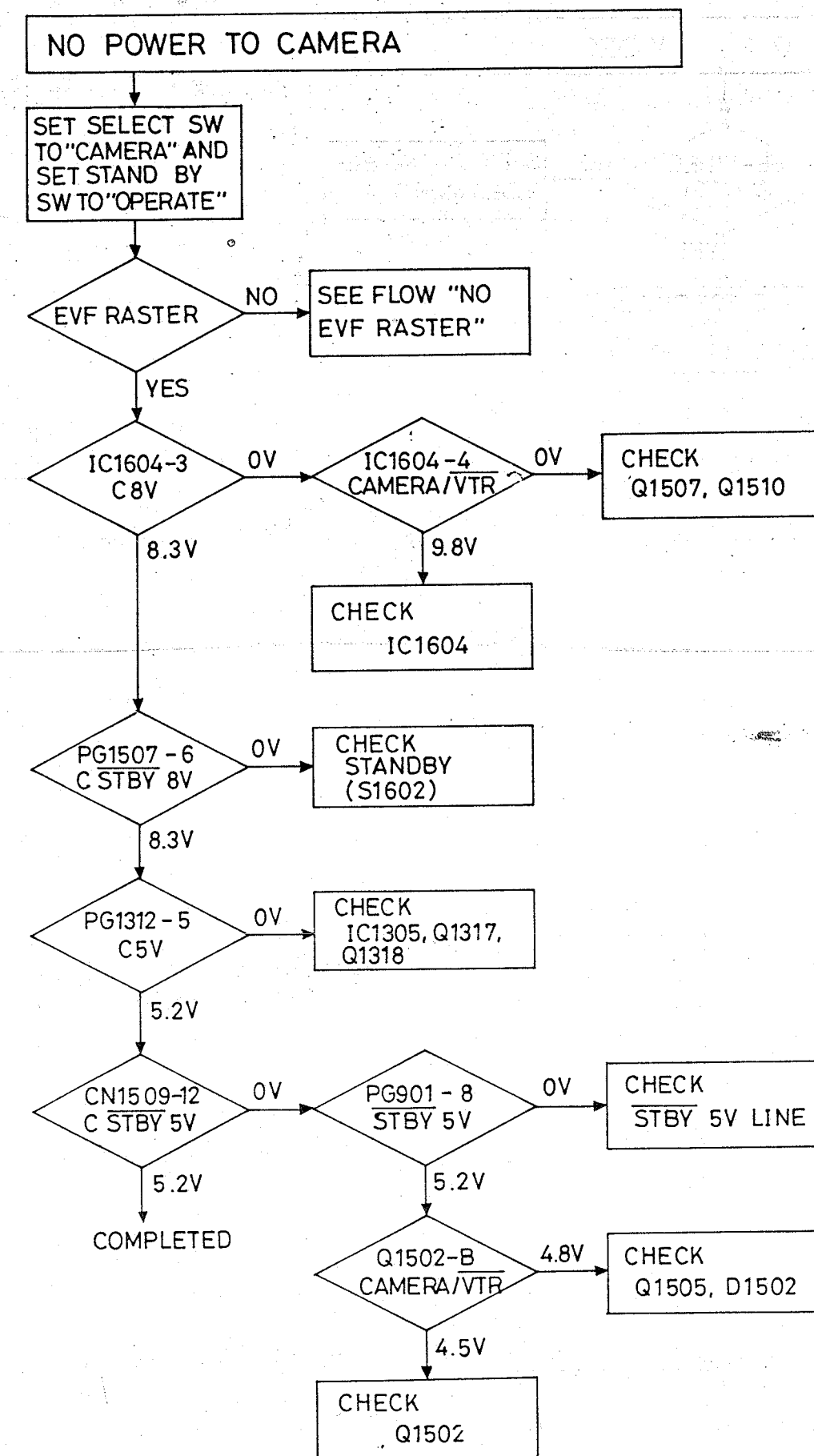
4. No play video



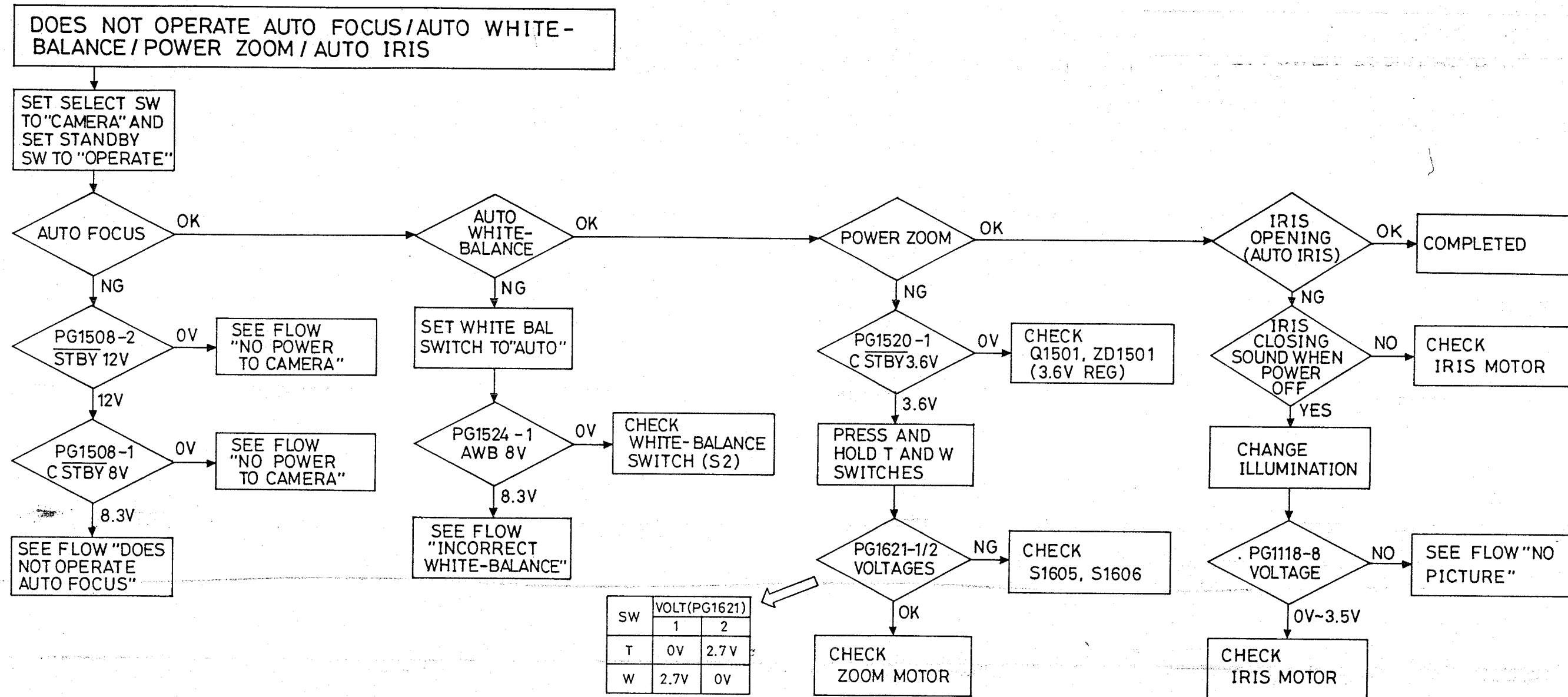
5. No play chroma



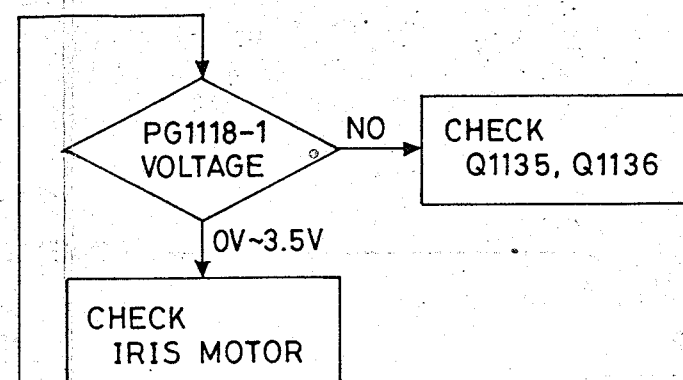
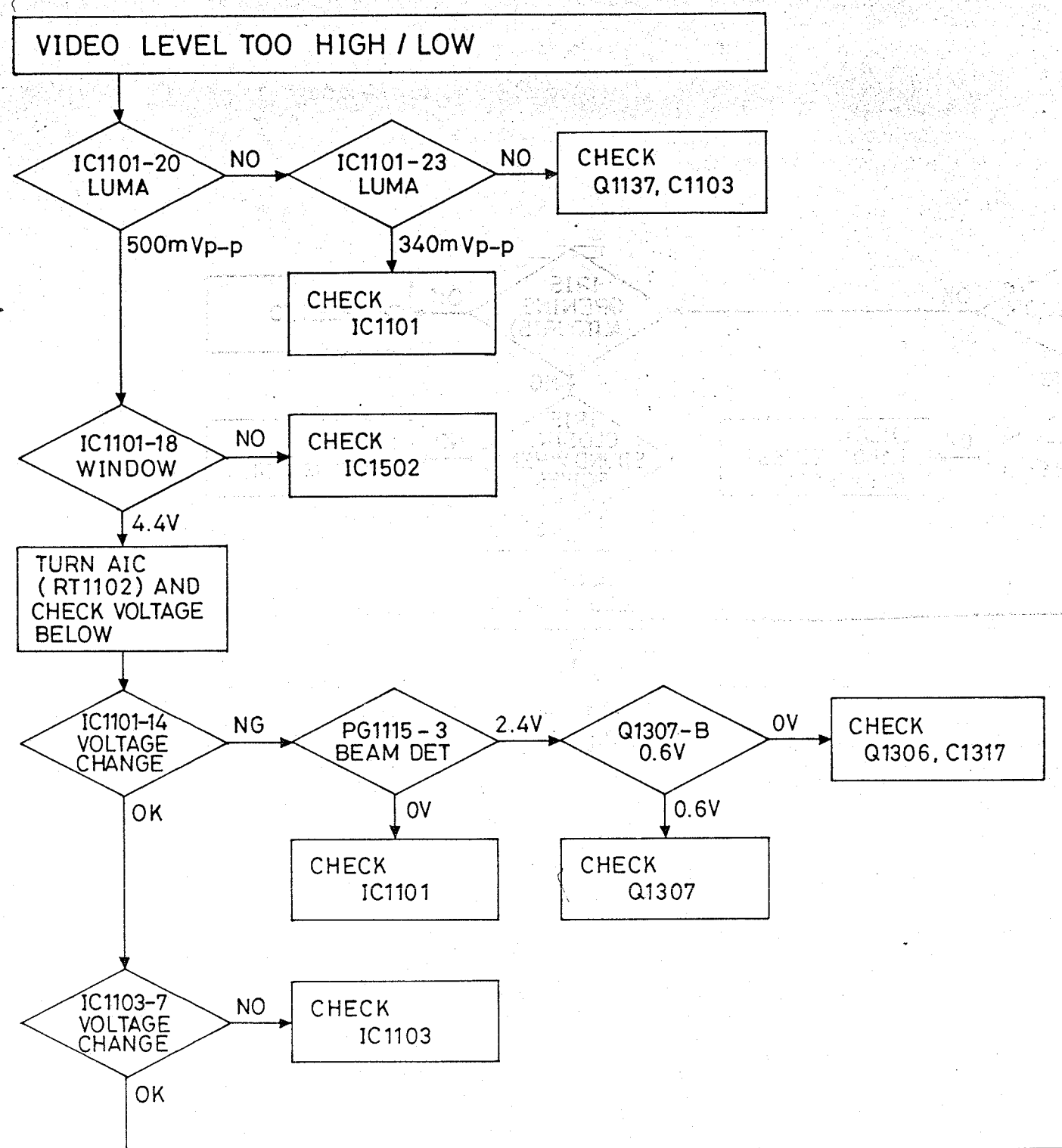
6. No power to camera



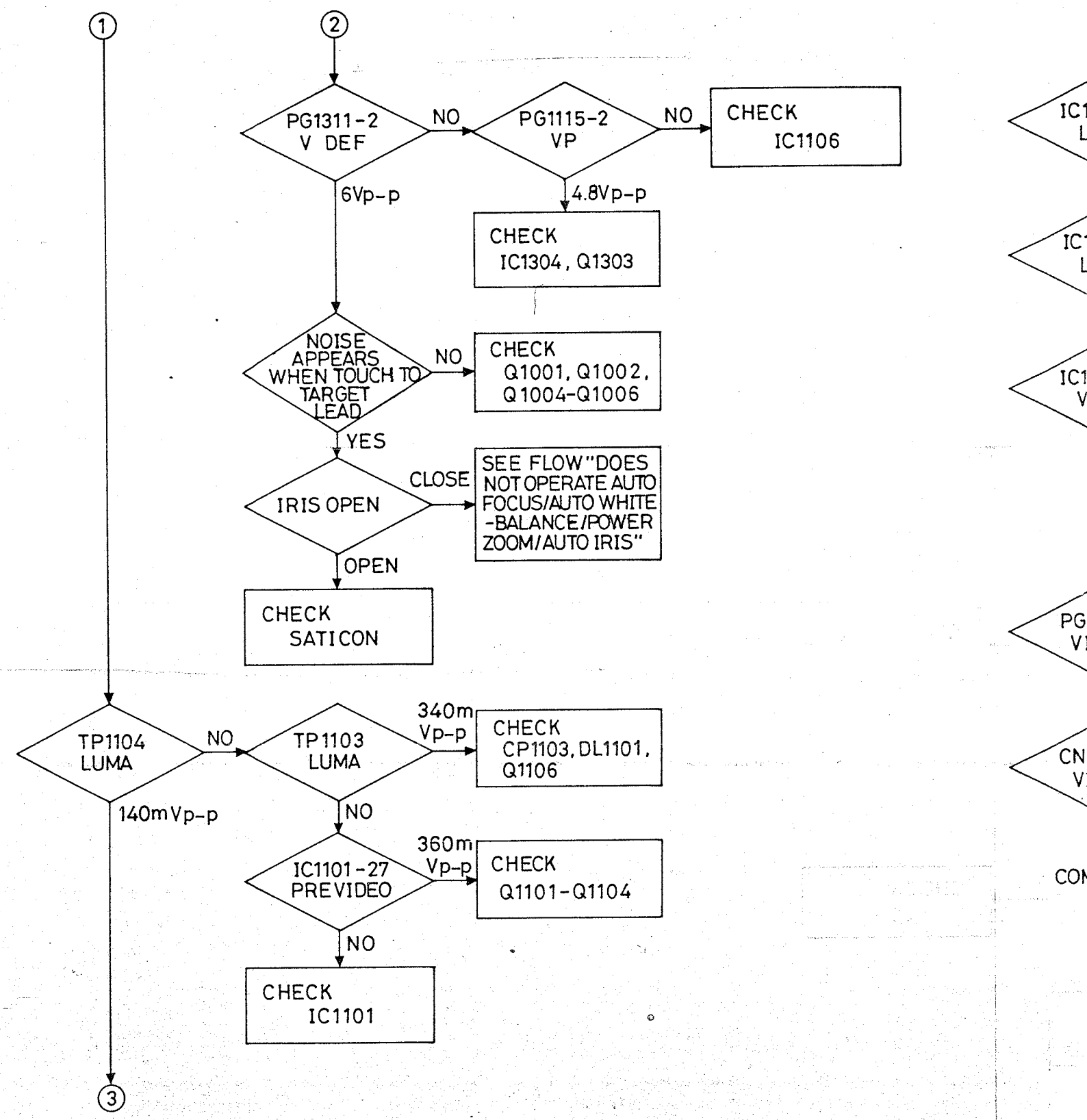
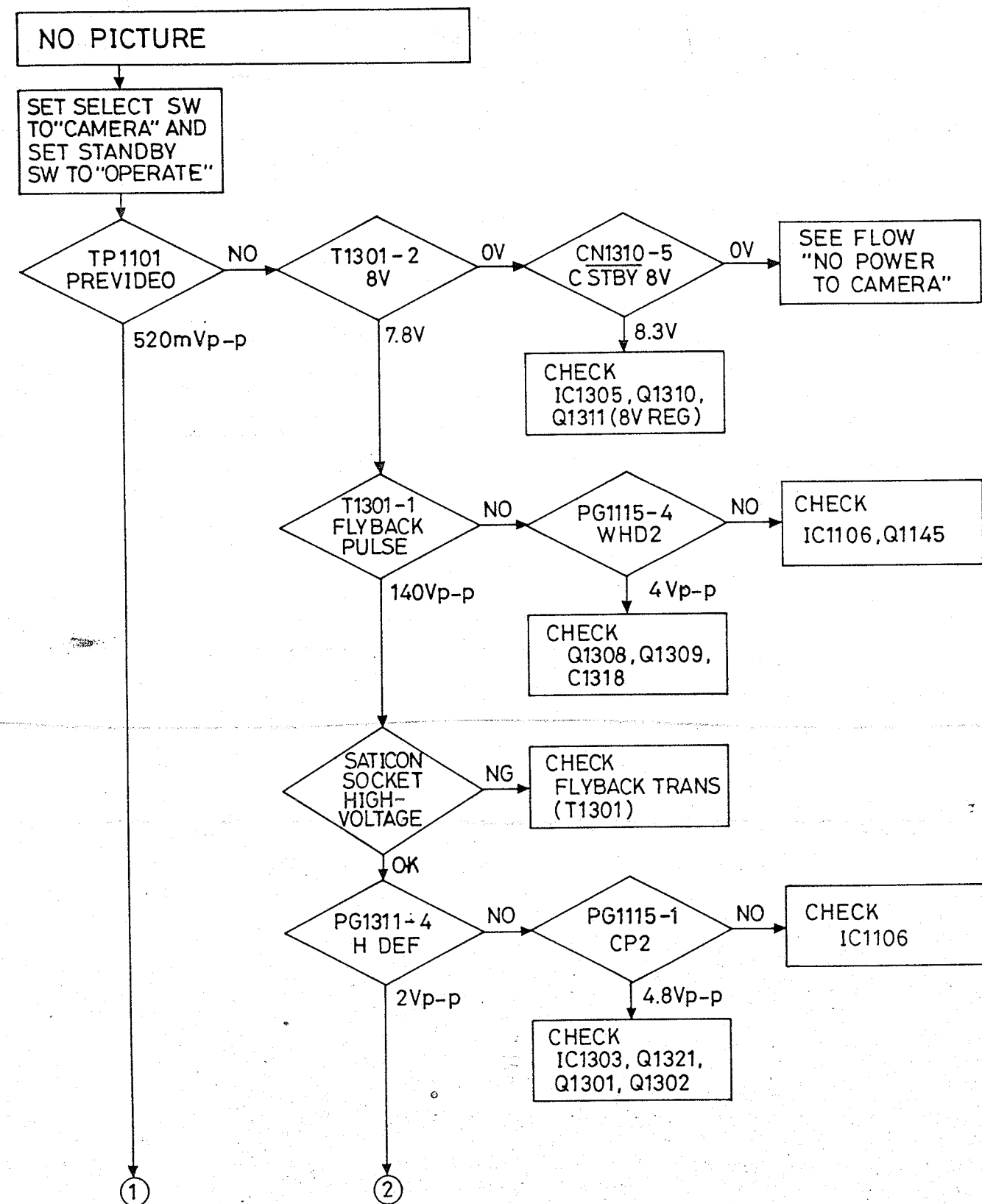
7. Does not operate auto focus/auto white-balance/power zoom/auto iris

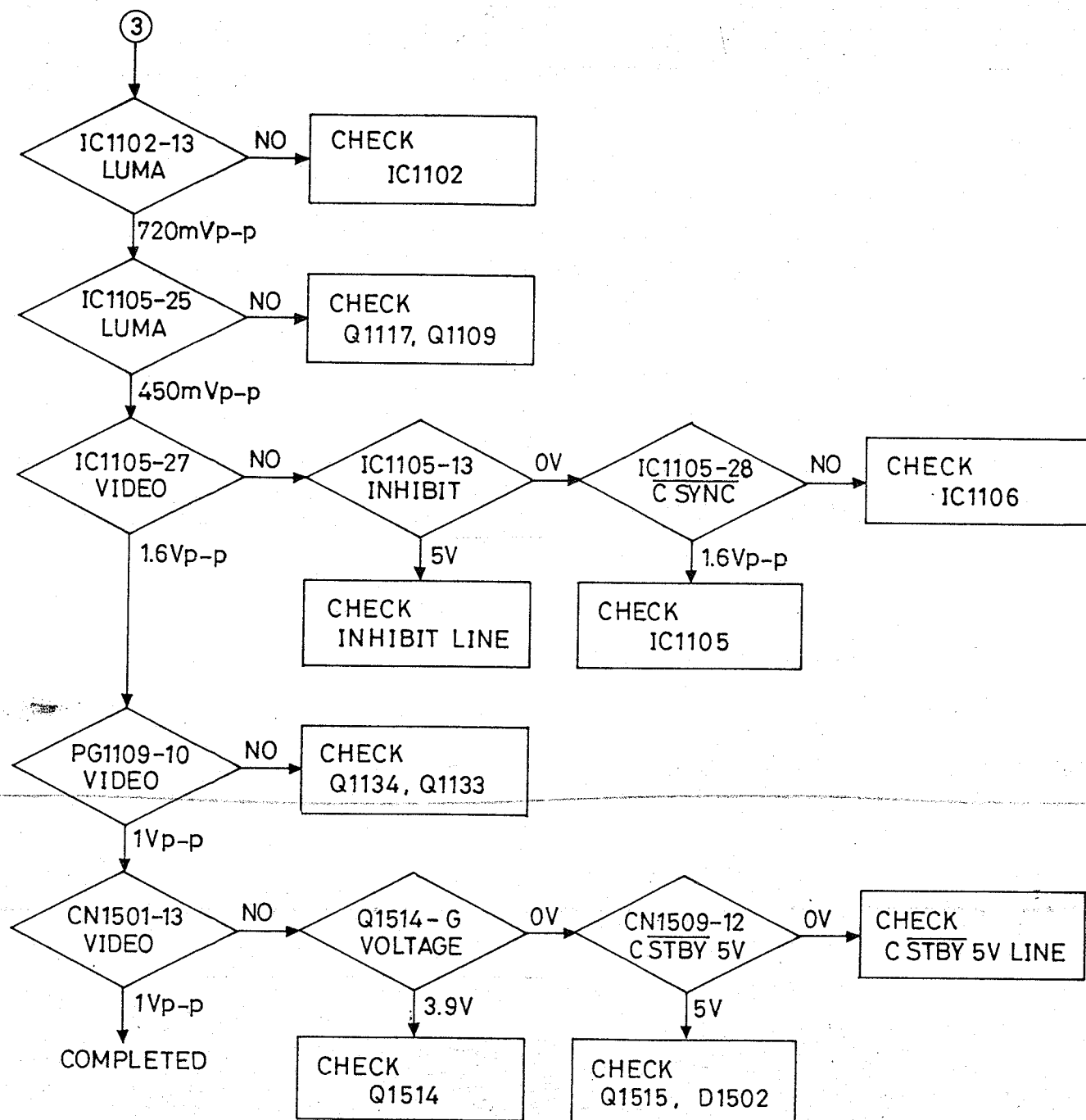


8. Video level too high/low

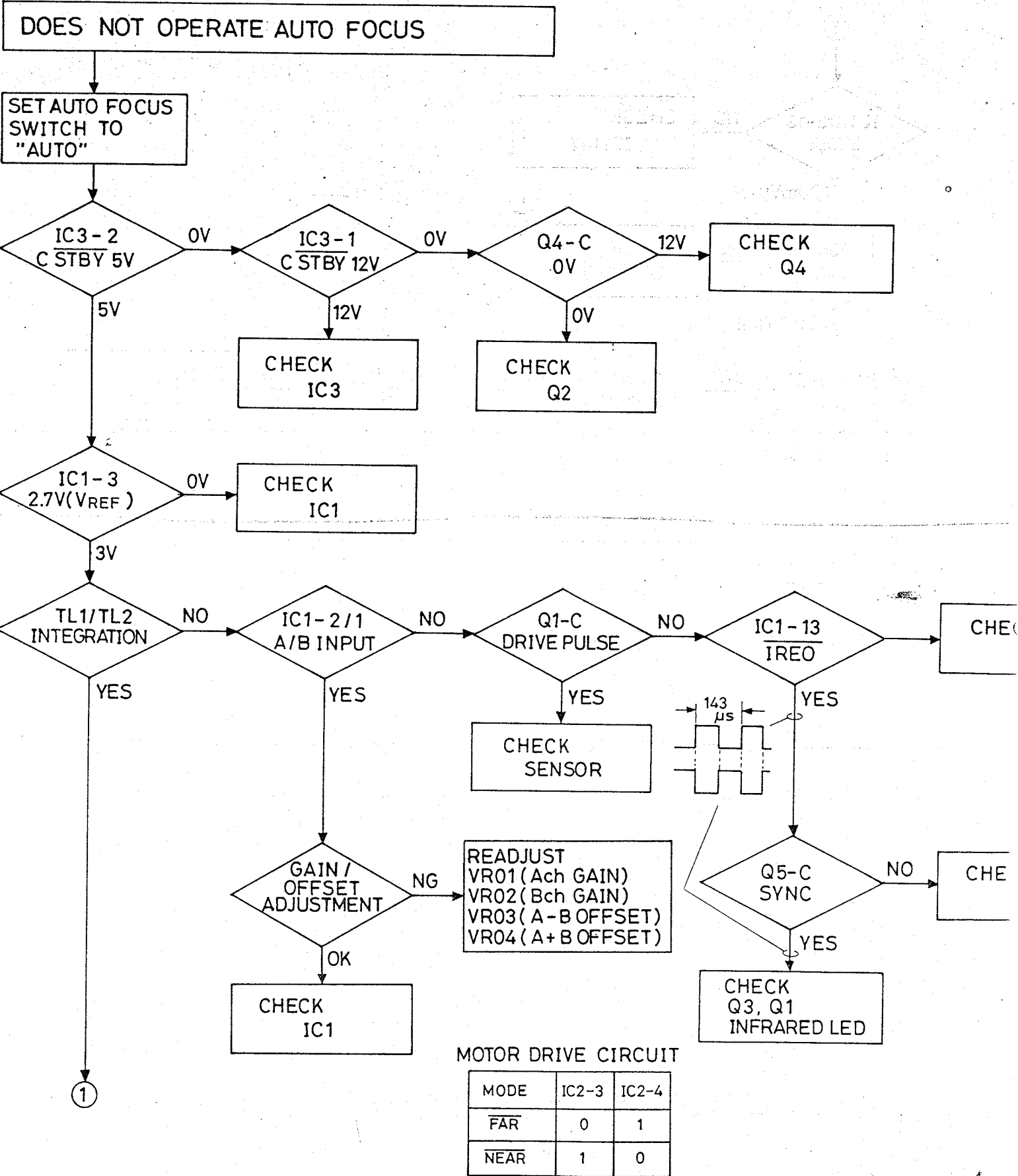


9. No picture

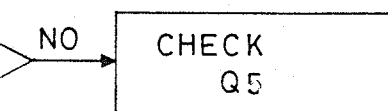
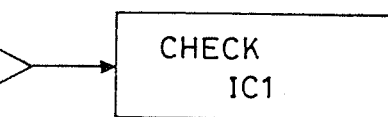
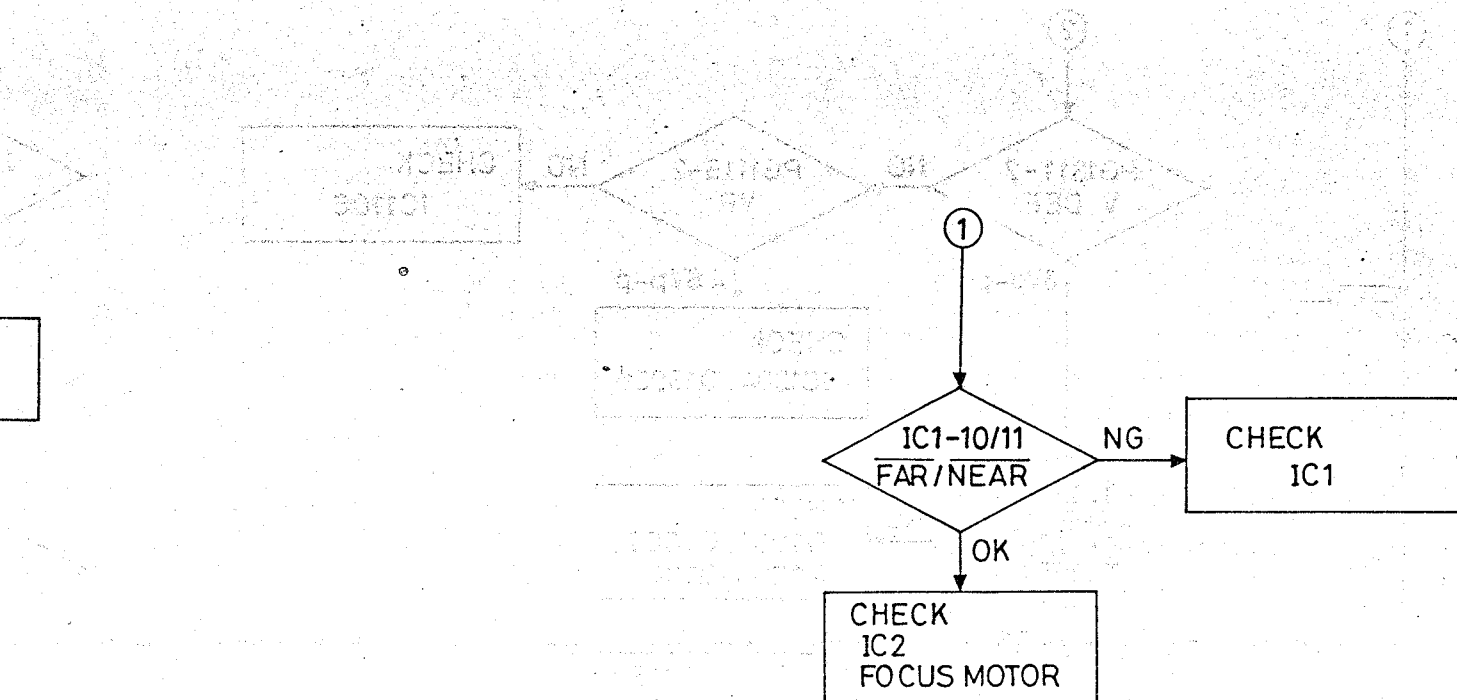




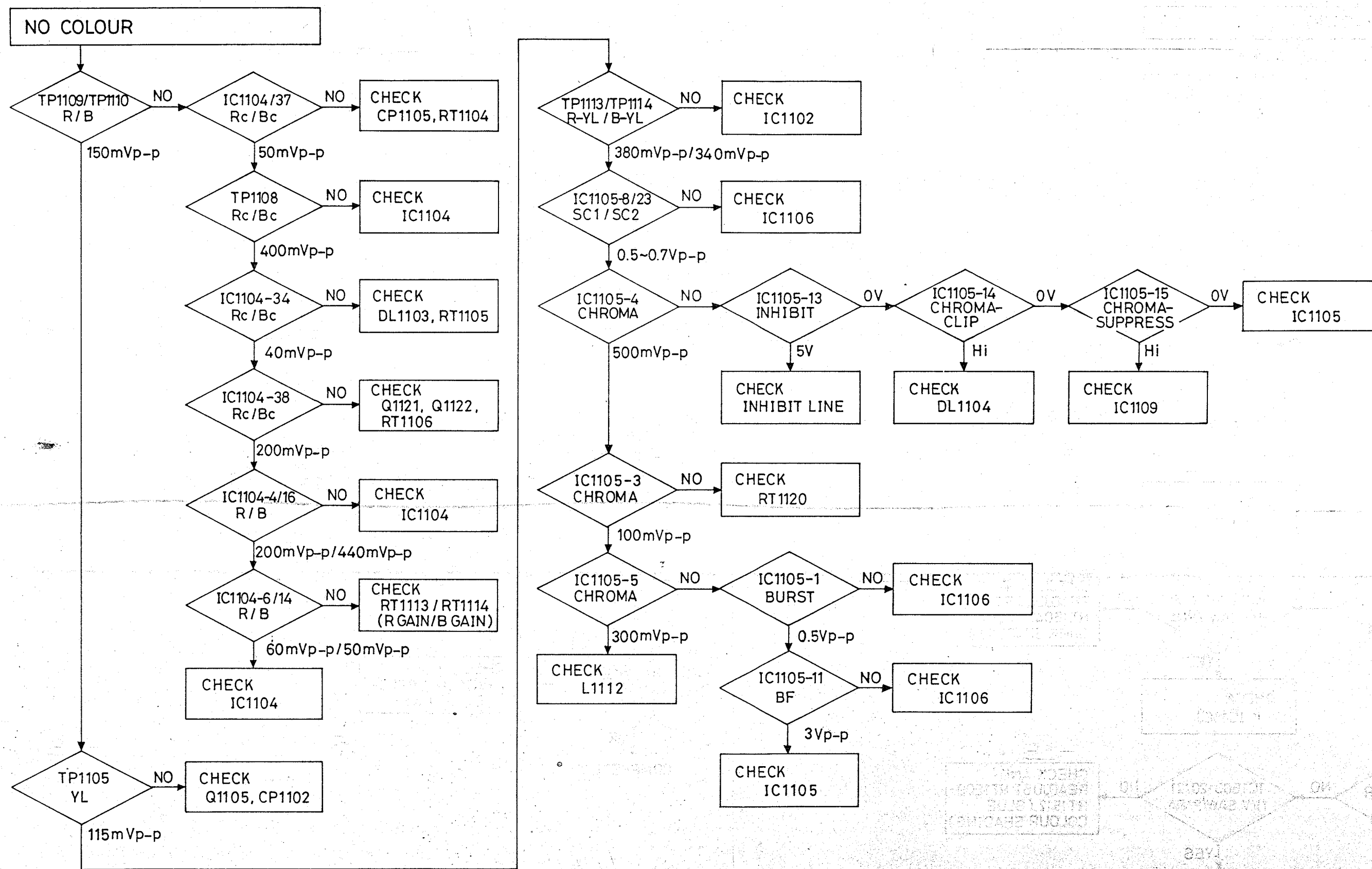
10. Does not operate auto focus



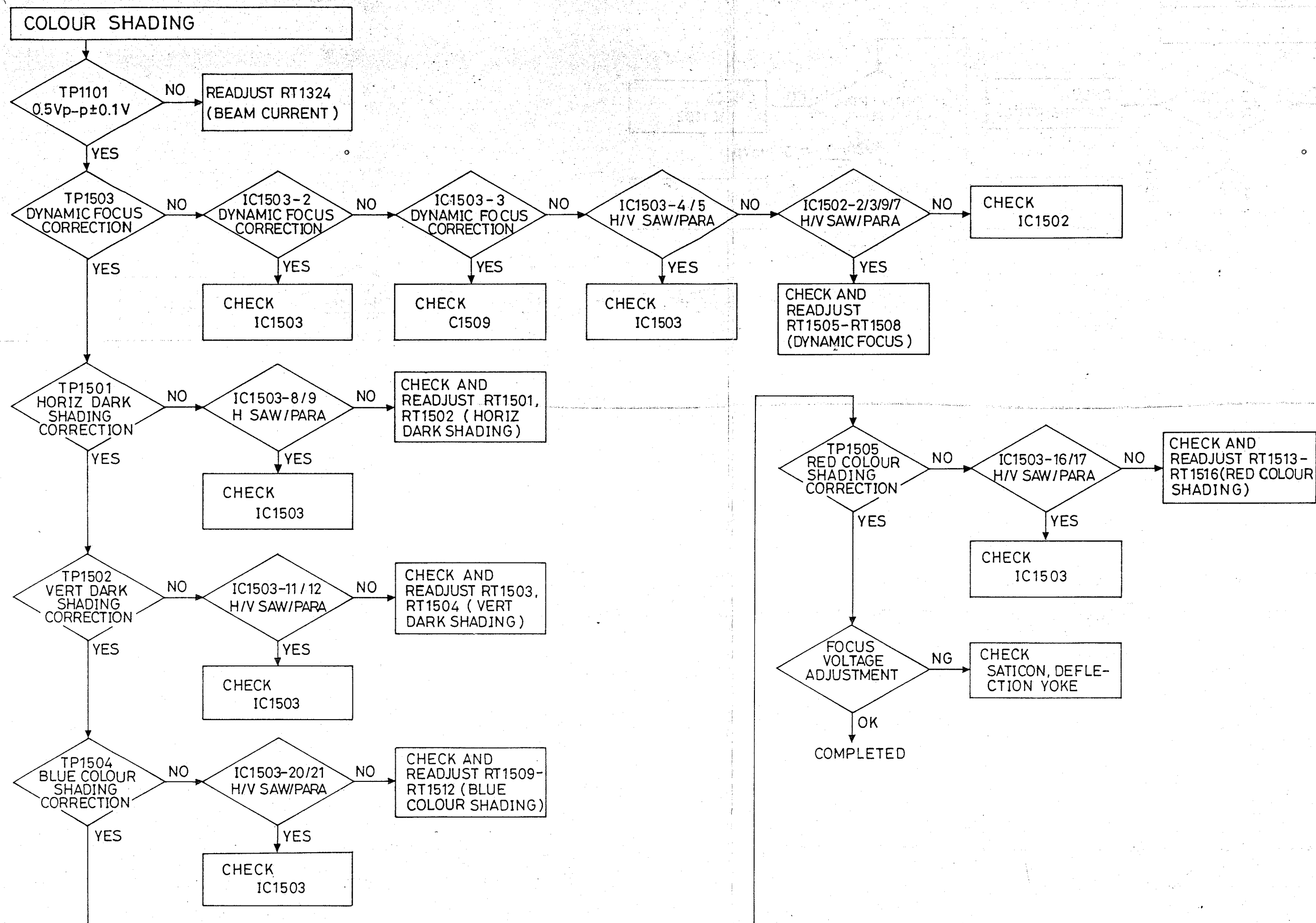
1:5V, 0:0V



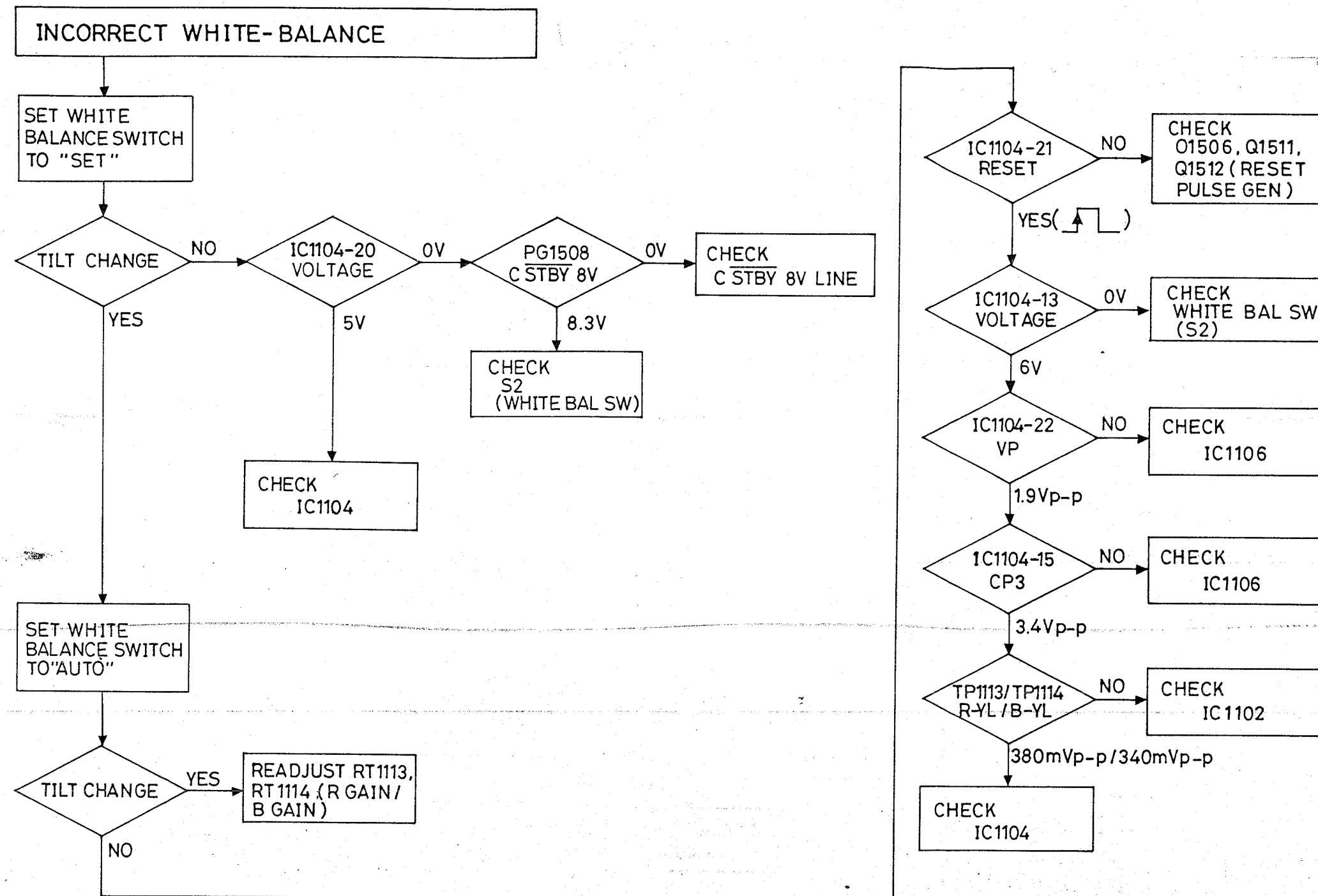
11. No Colour



12. Colour shading



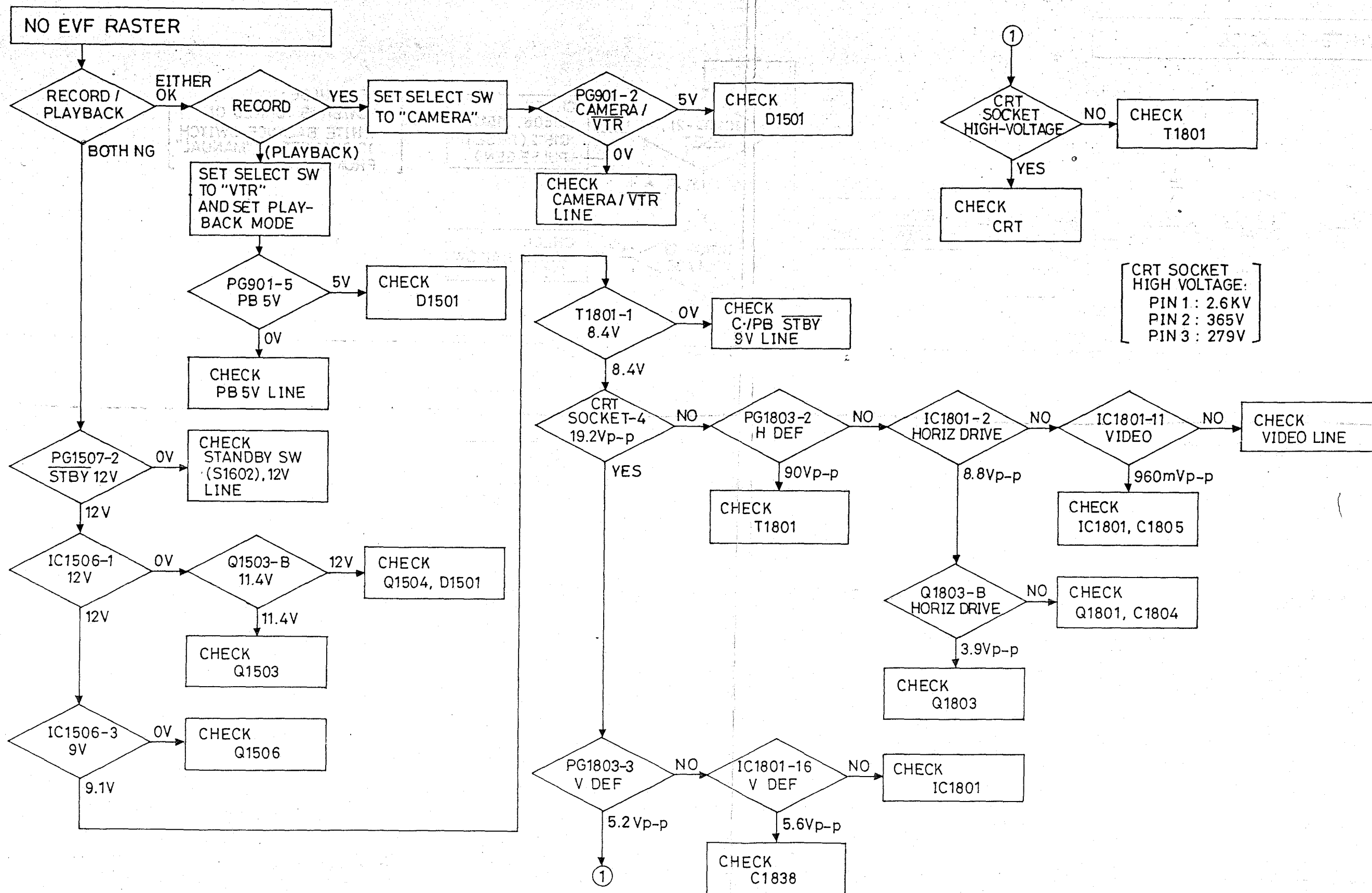
13. Incorrect white-balance



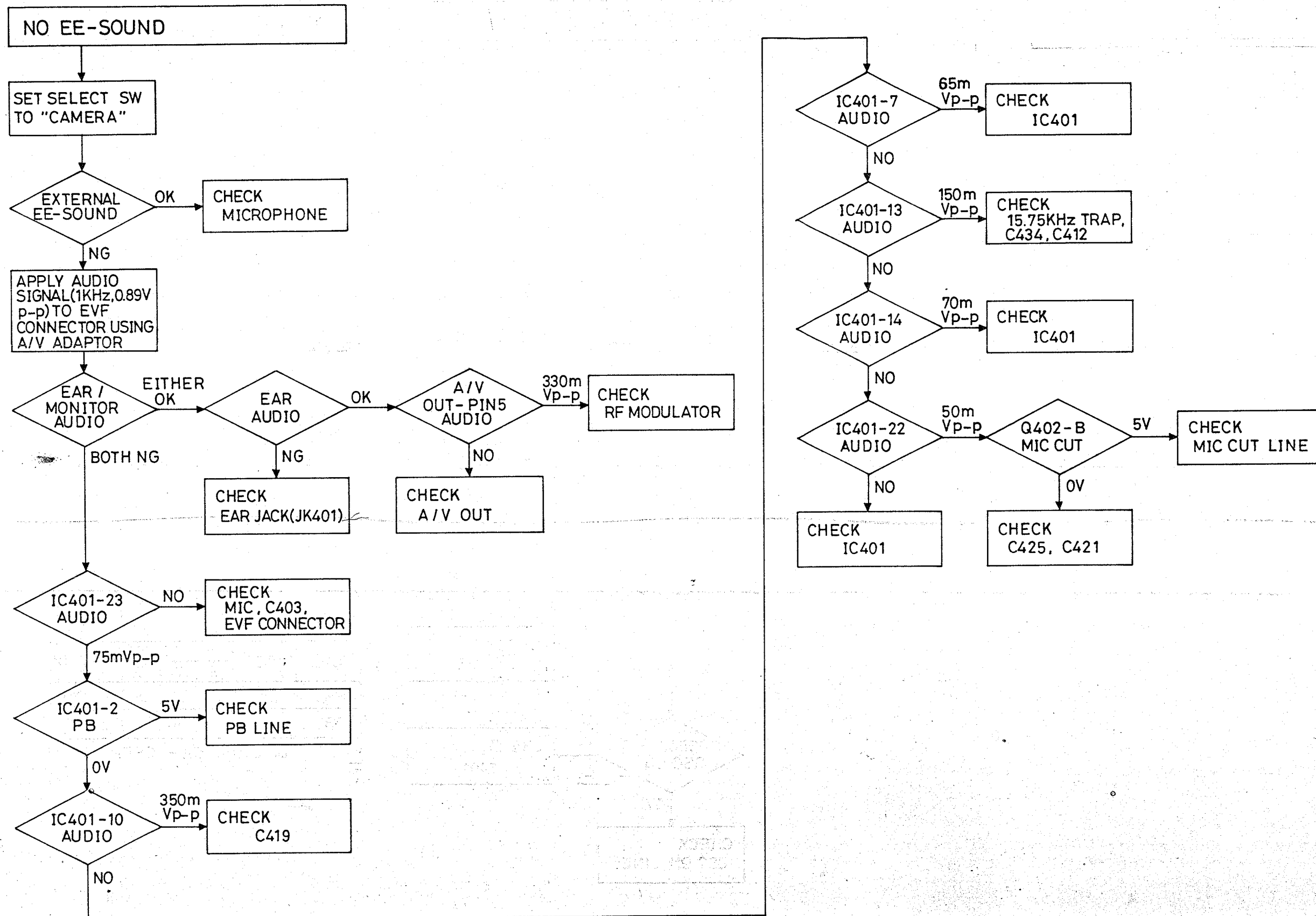
RESET PULSE :

- POWER IS TURNED ON
- WHITE BALANCE SWITCH IS CHANGED TO "MANUAL" FROM "AUTO"

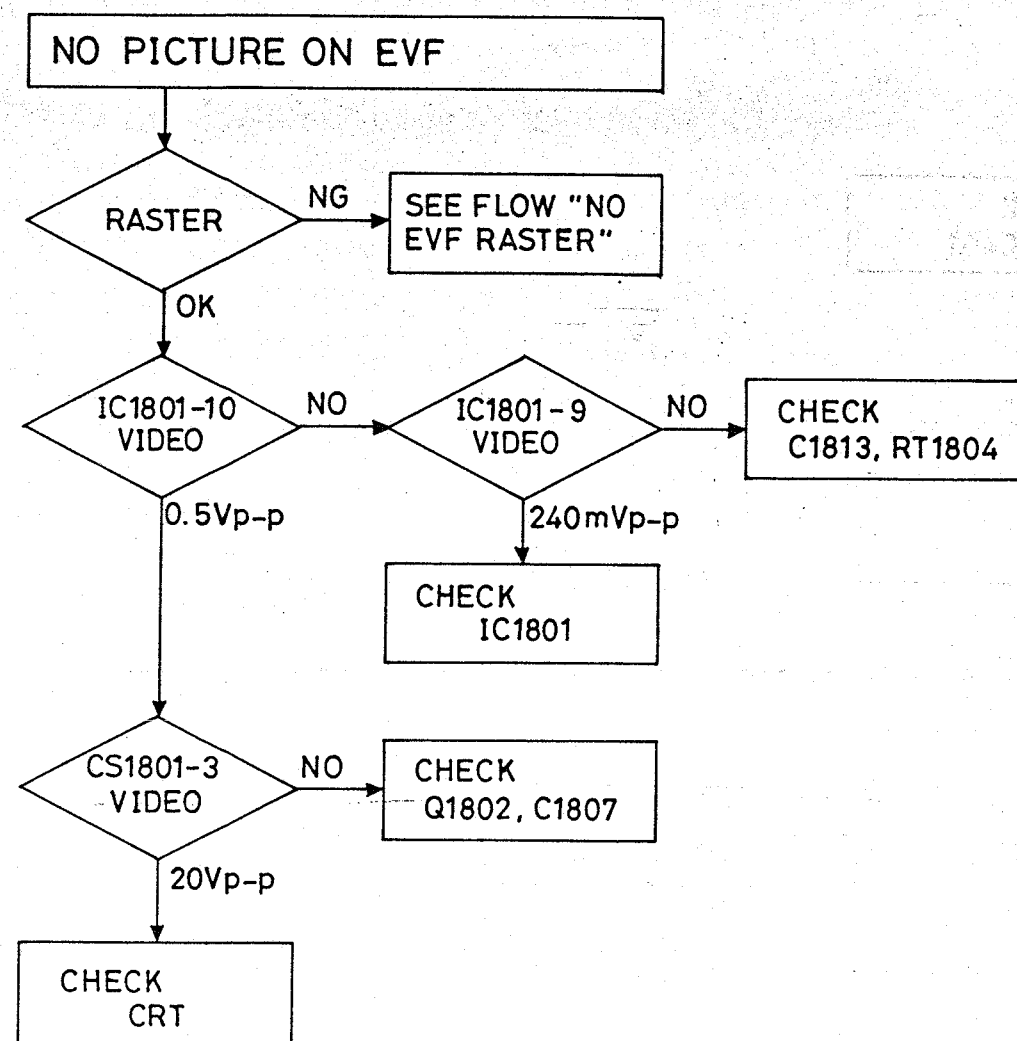
14. No EVF raster



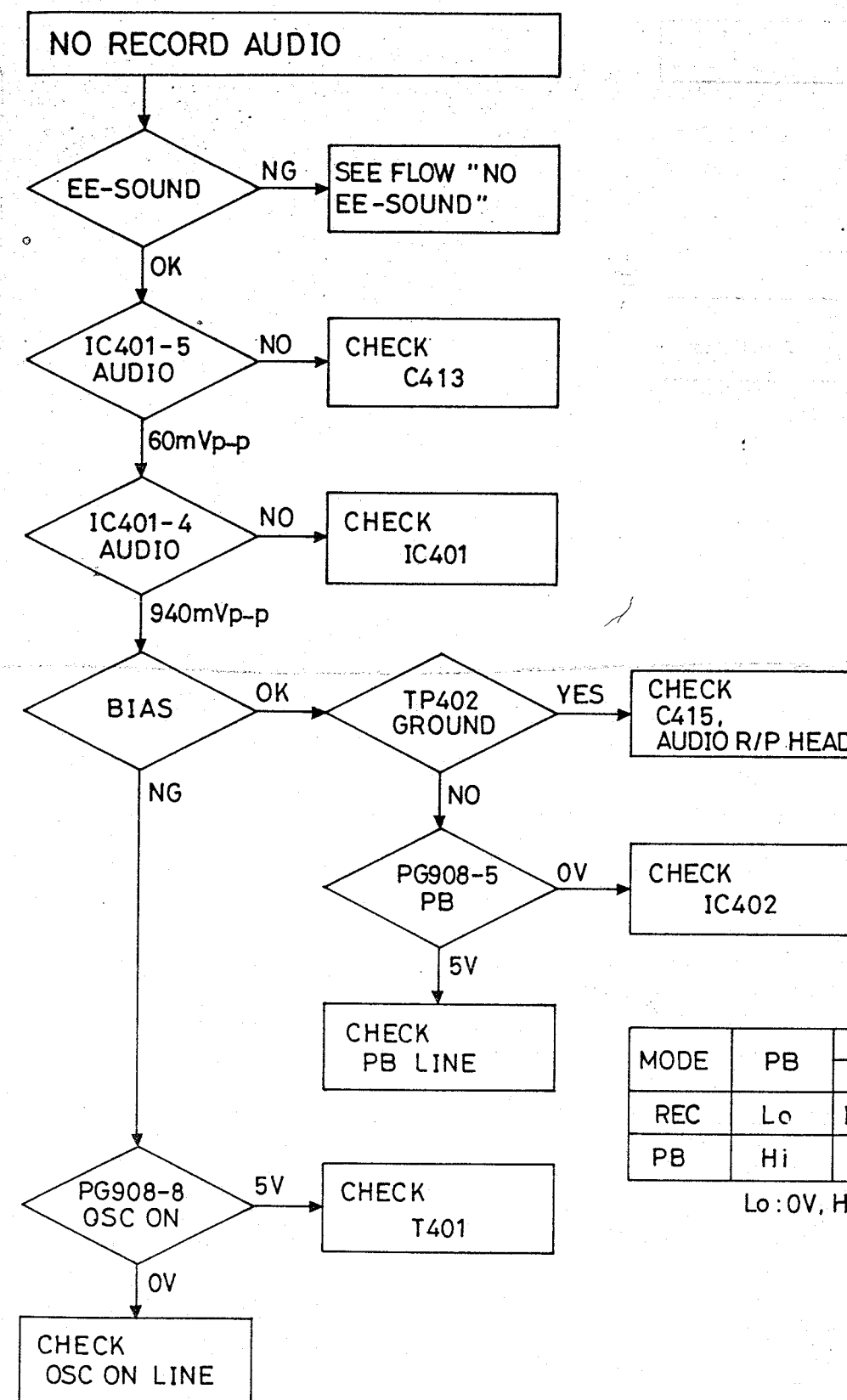
15. No EE-sound



16. No picture on EVF



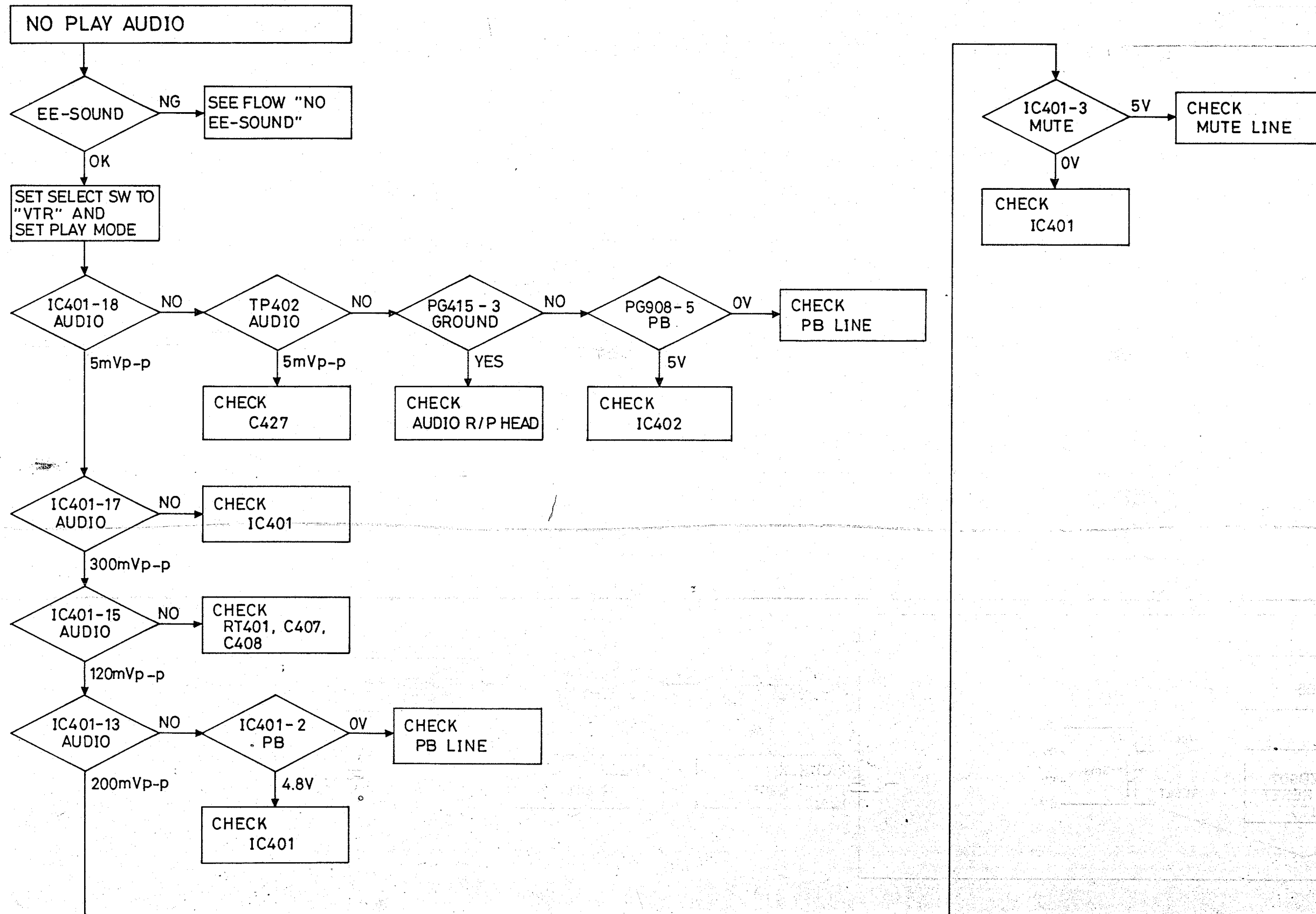
17. No record audio



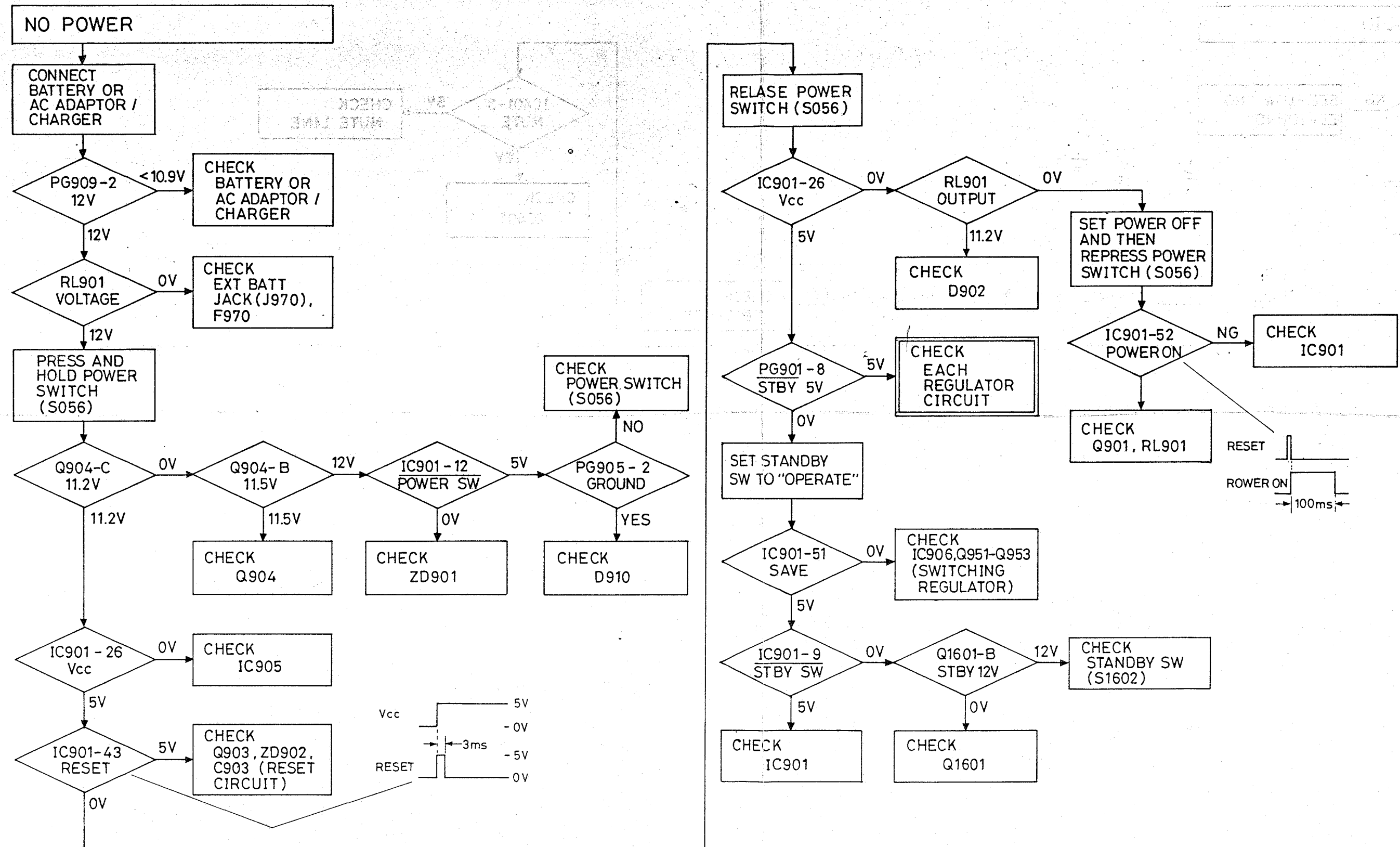
MODE	PB	IC402				Q401
		5	7	3	1	
REC	Lo	Hi	Lo	Lo	-	OFF
PB	Hi	Lo	Hi	-	Lo	ON

Lo: 0V, Hi: 5V, -: OPEN

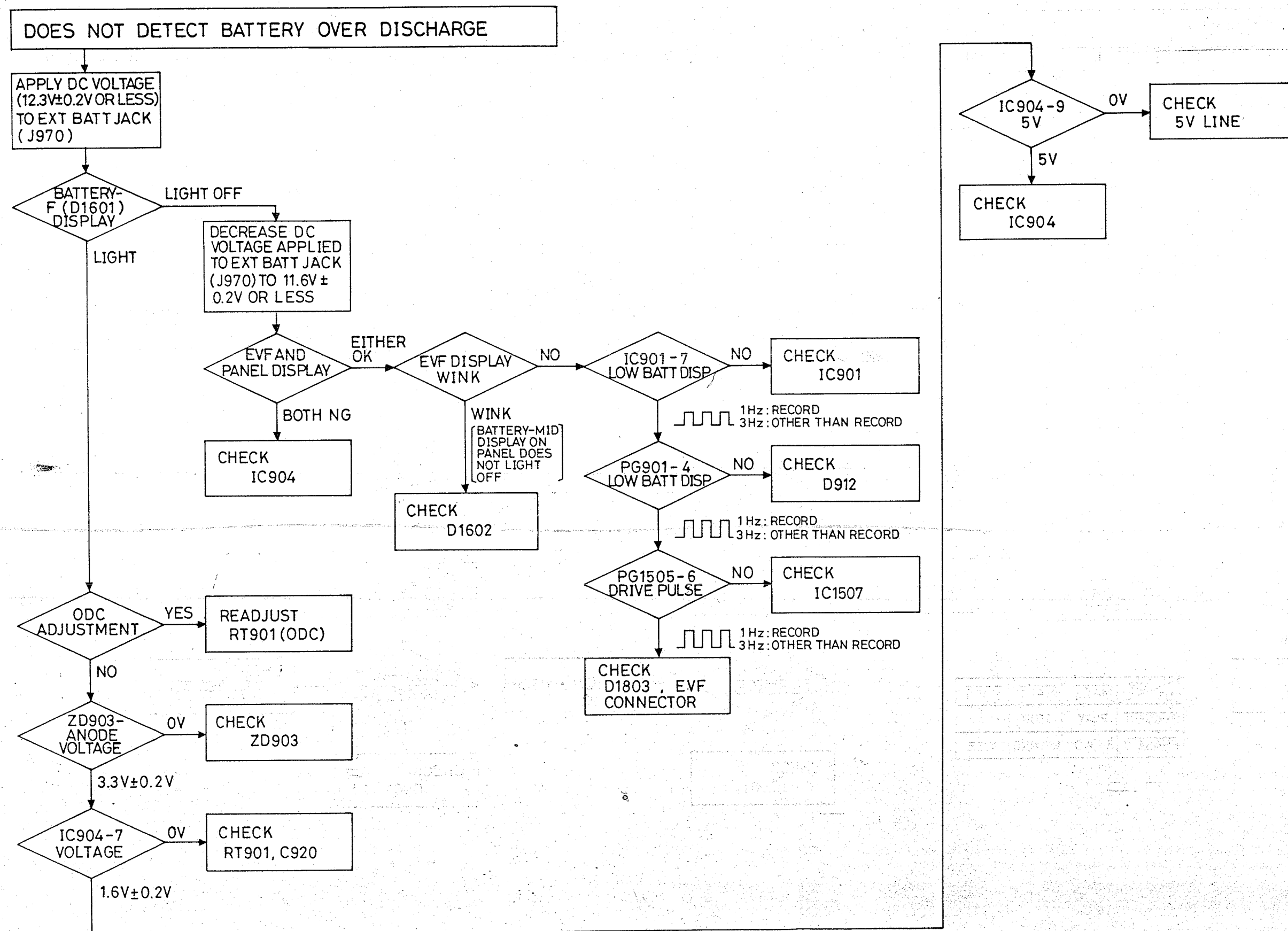
18. No play audio



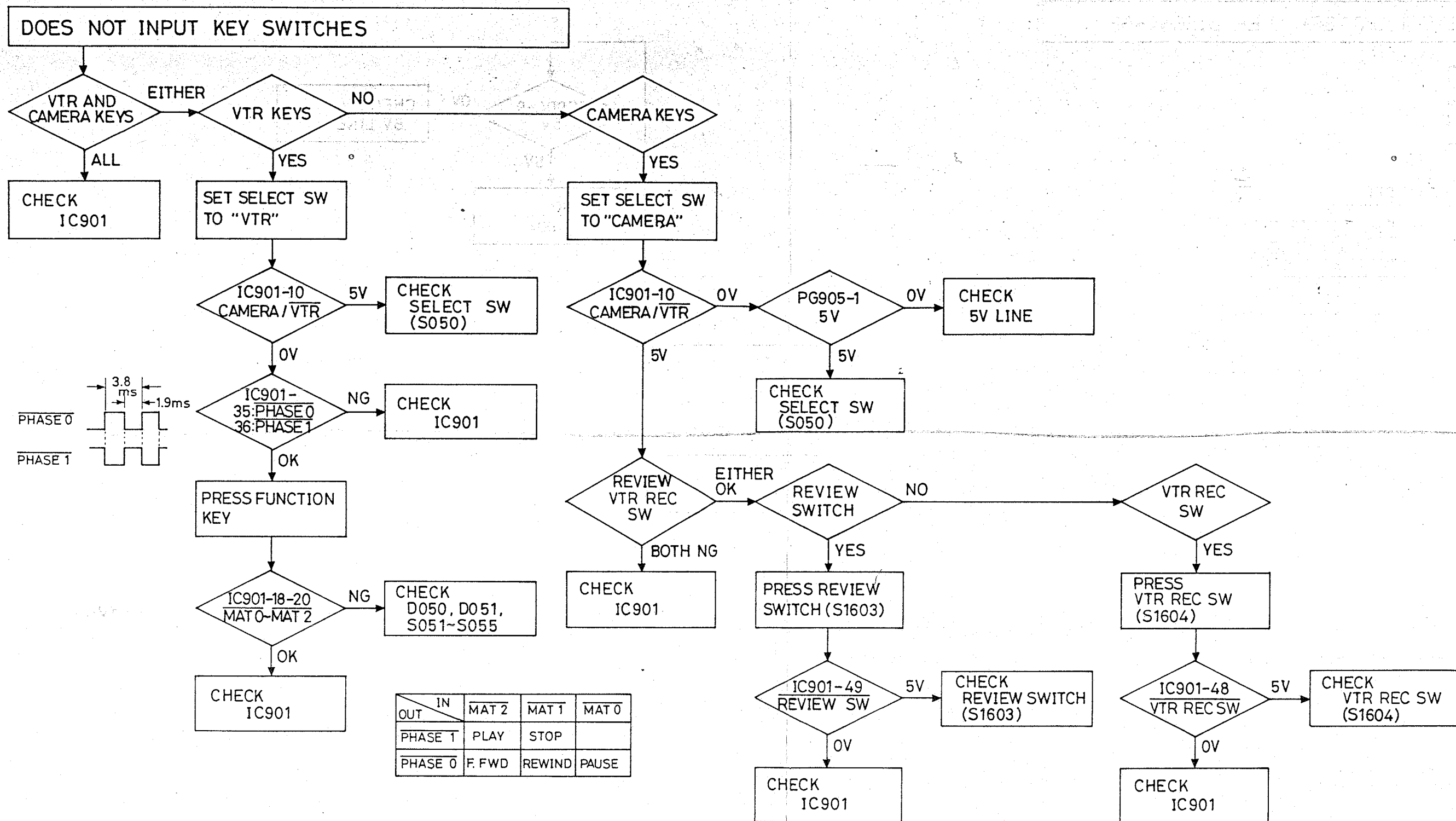
19. No power



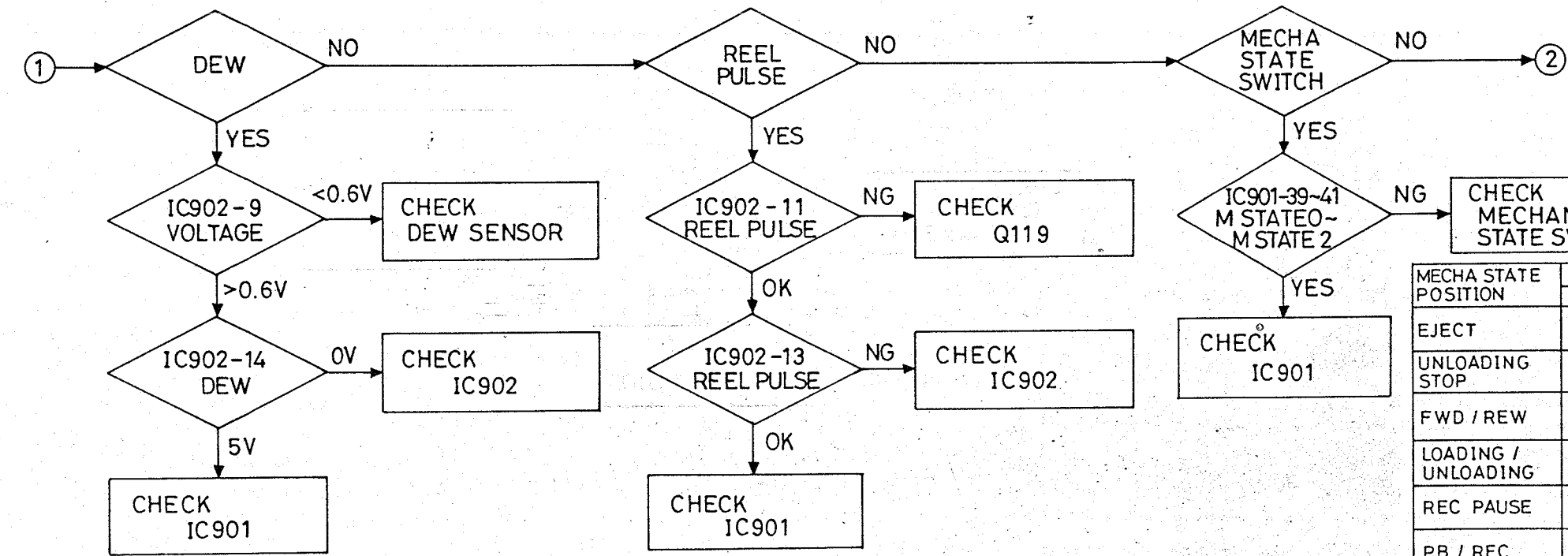
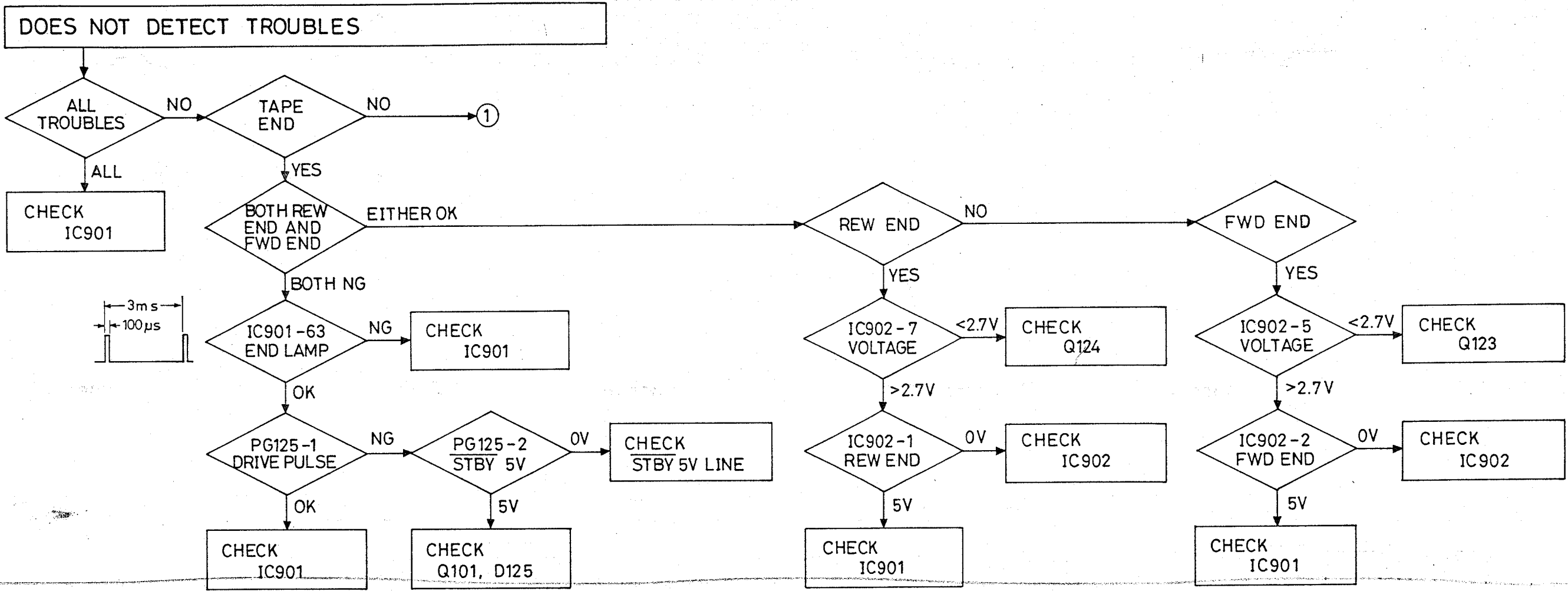
20. Does not detect battery over discharge



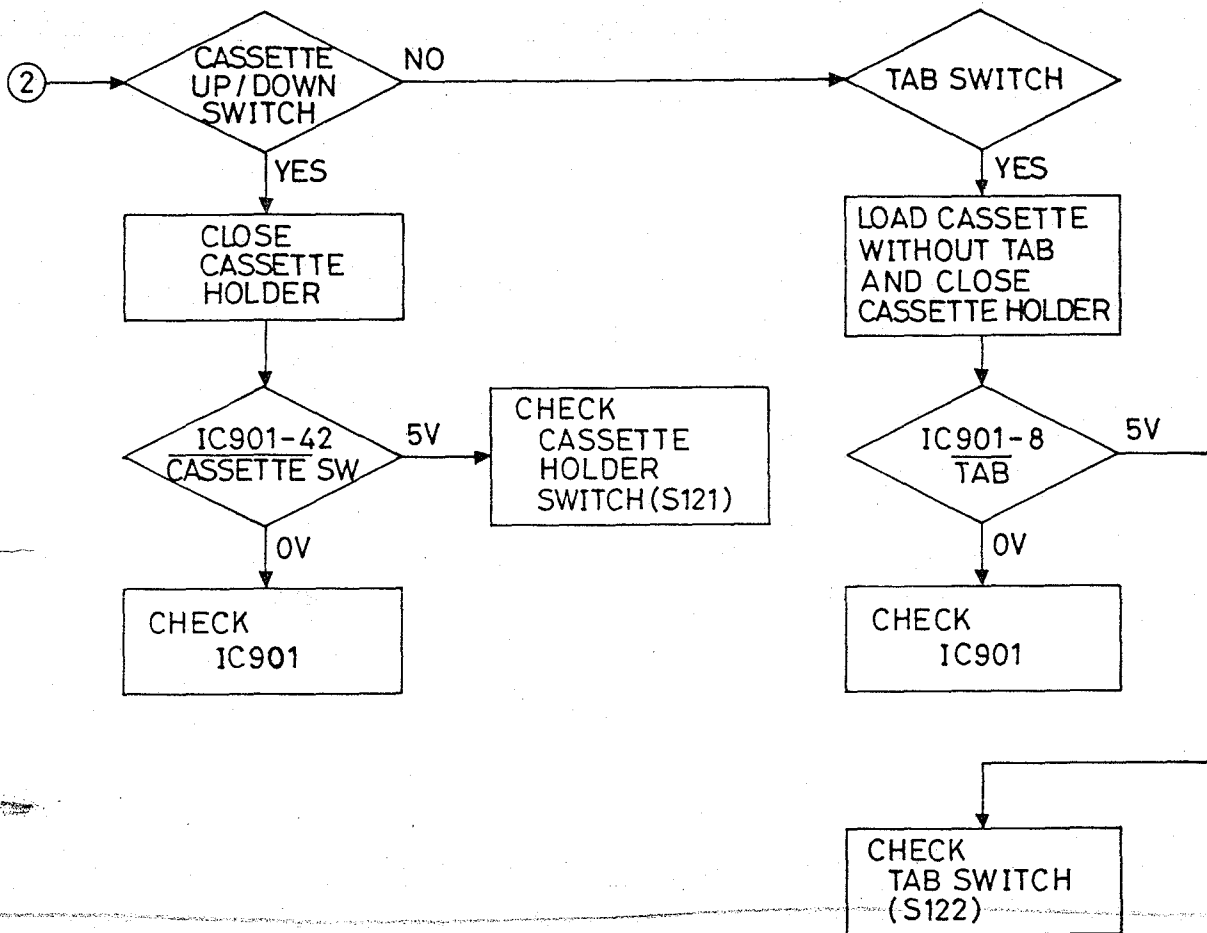
21. Does not input key switches



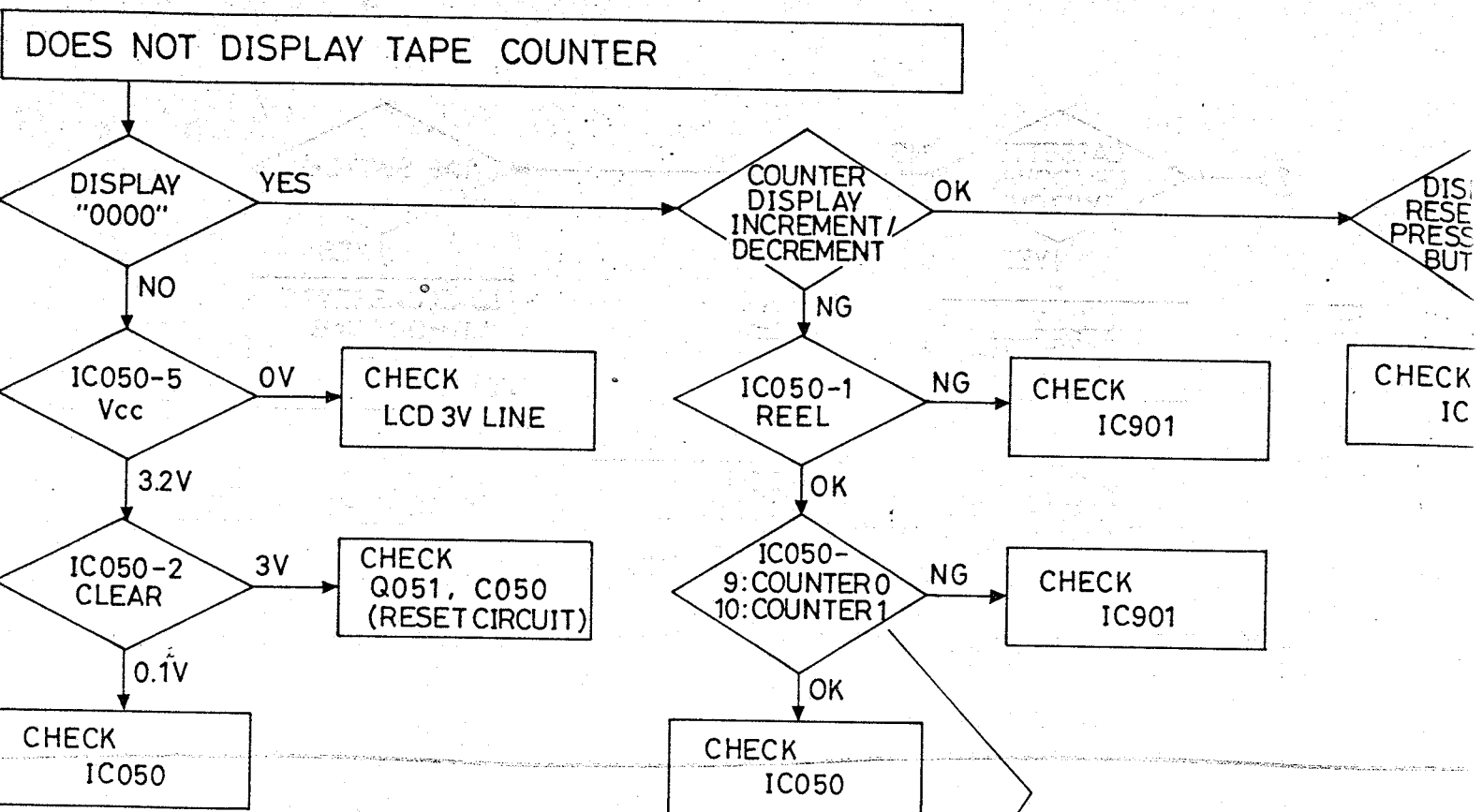
22. Does not detect troubles



MECHA STATE POSITION	M STATE			MODE
	2	1	0	
EJECT	0	1	1	EJECT
UNLOADING STOP	0	1	0	
FWD / REW	1	1	0	FWD / REW
LOADING / UNLOADING	1	0	0	
REC PAUSE	1	0	1	REC PAUSE
PB / REC	0	0	1	REC/PB/PB PAUSE/ VISUAL SEARCH

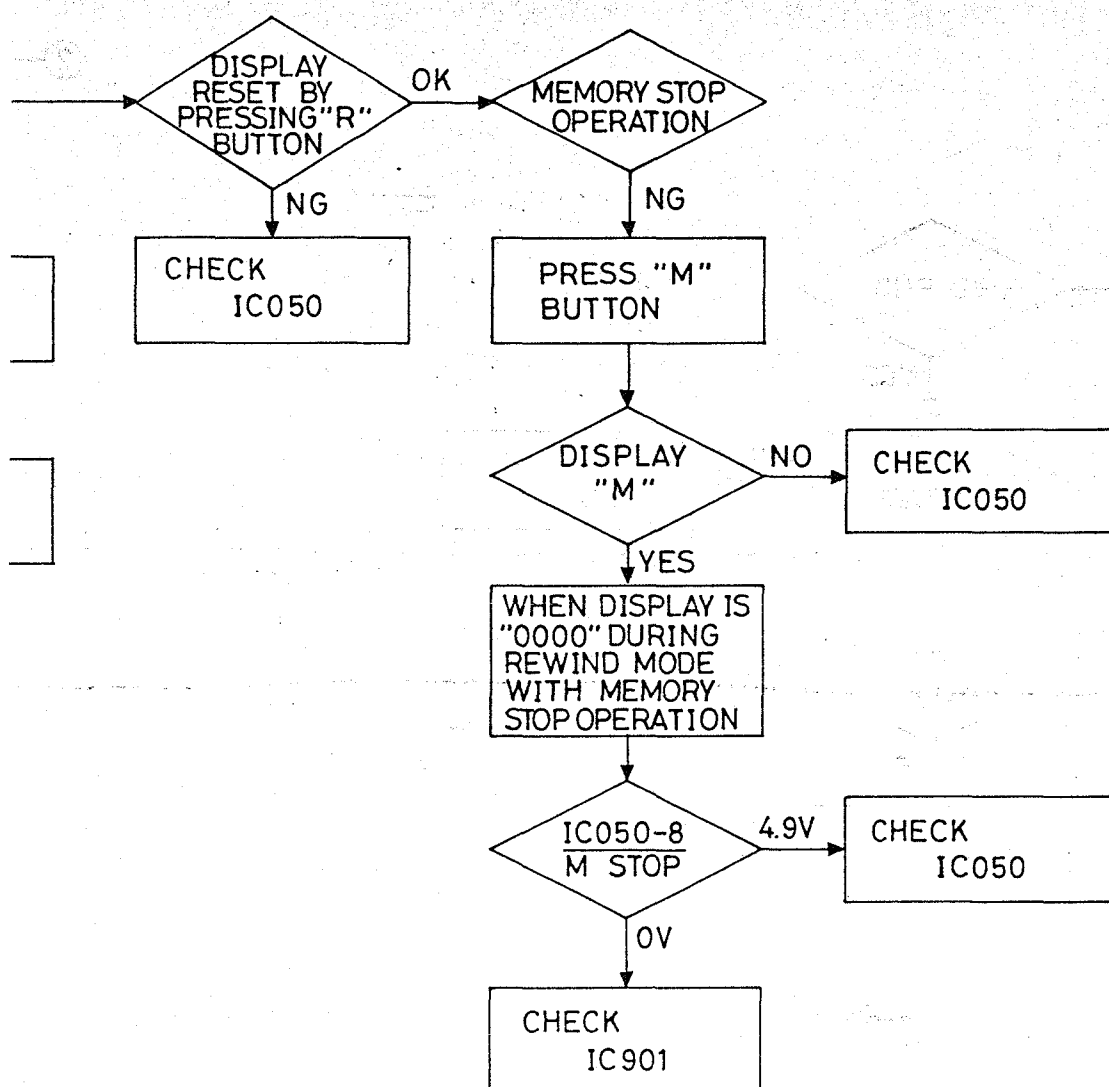


23. Does not display tape counter

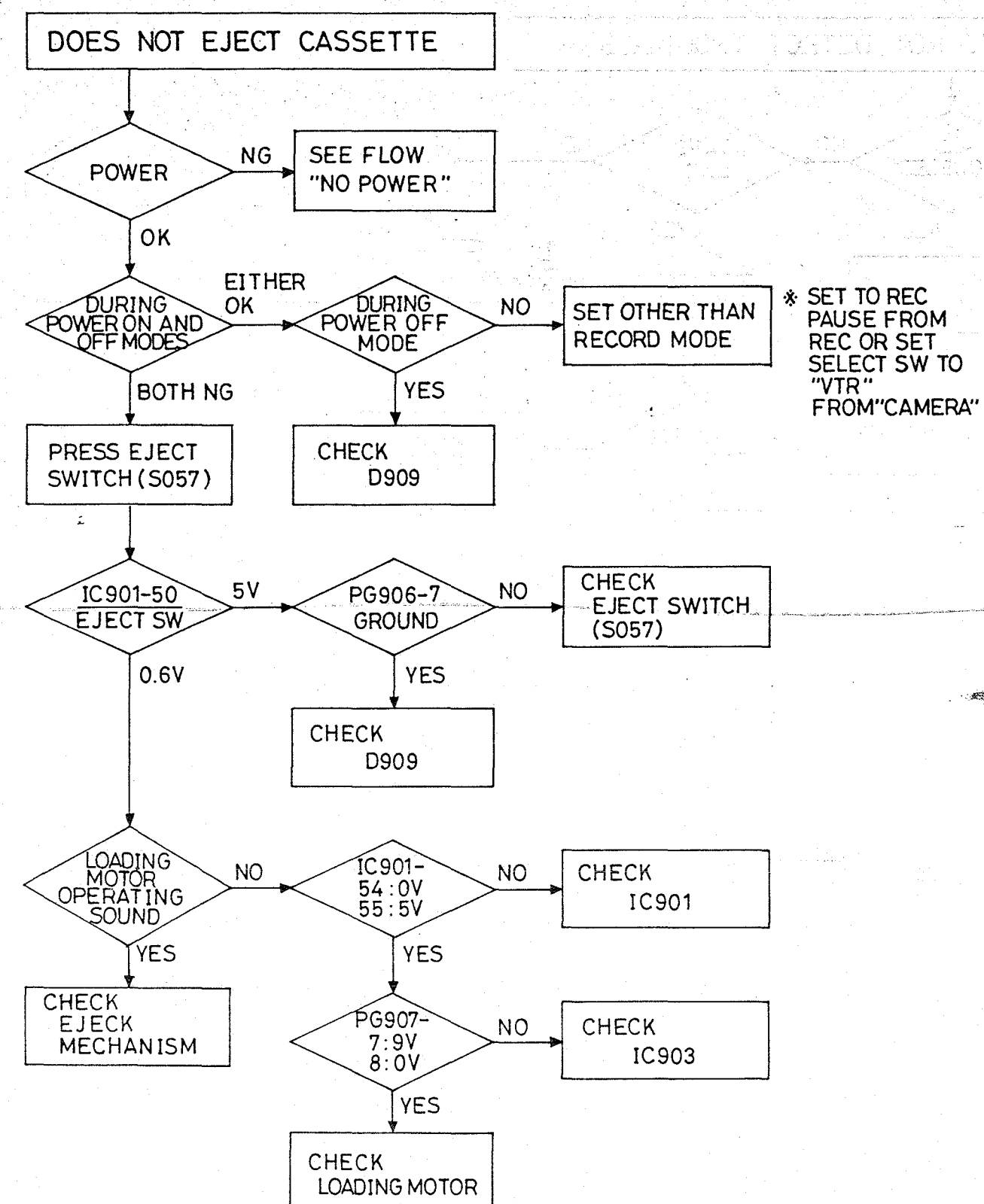


MODE	COUNTER 1	COUNTER 0	COUNTER
STOP/PAUSE	1	1	STOP
REC/PB/FWD	1	0	INCREMENT
REW	0	1	DECREMENT

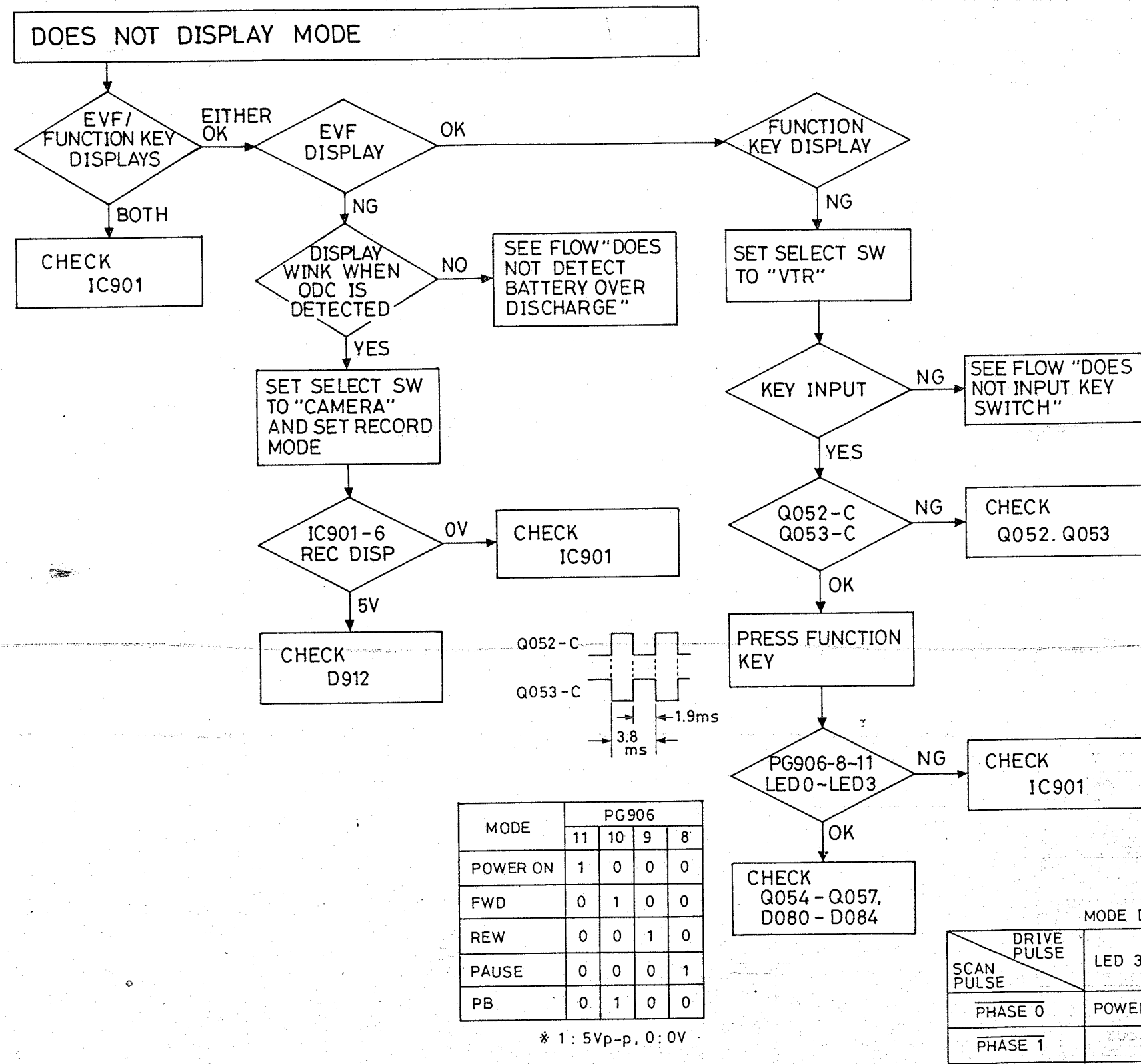
* 1 : 3.1V, 0 : 0.1V



24. Does not eject cassette



25. Does not display mode



26. St

ST
SC

C
AD

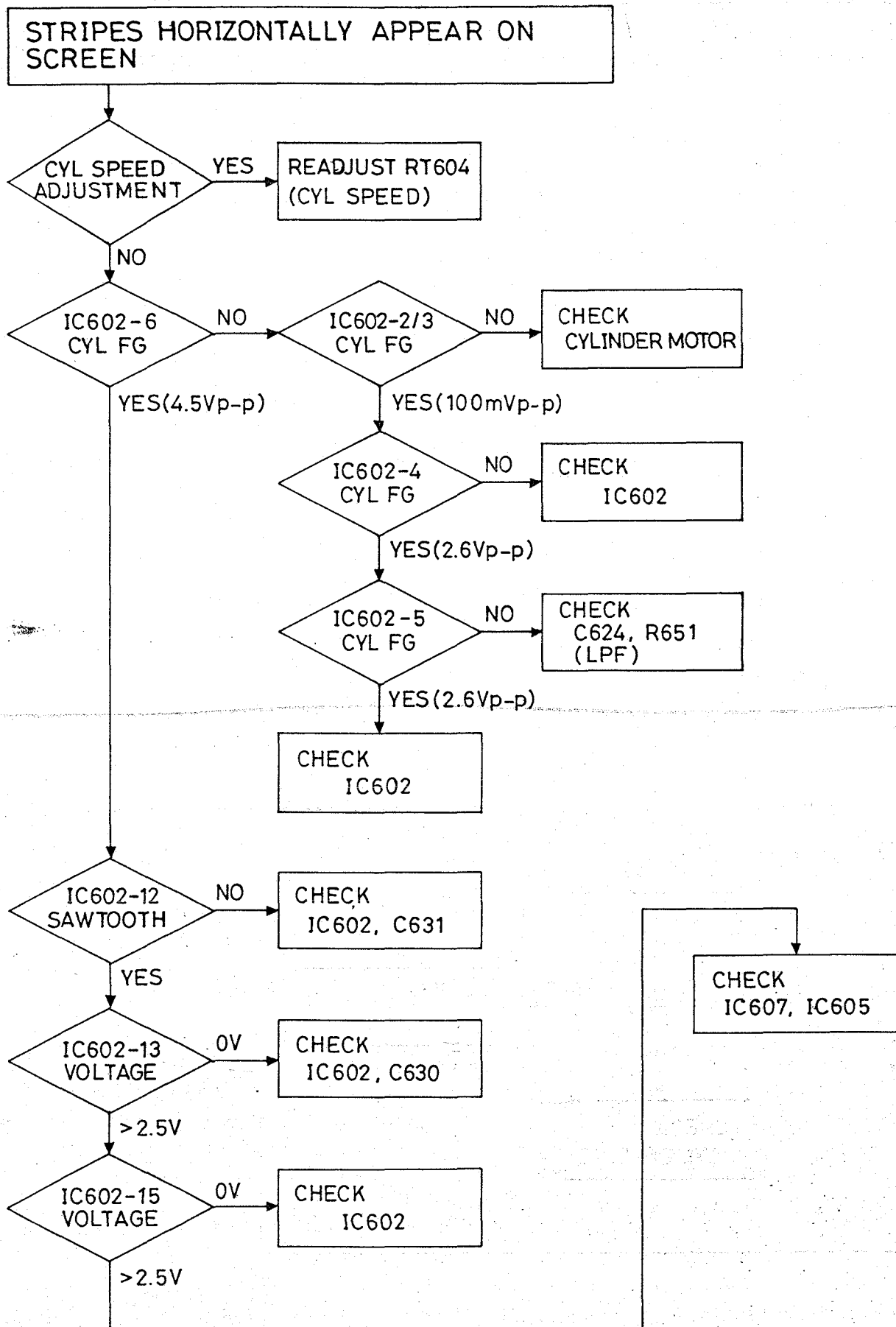
<

< S

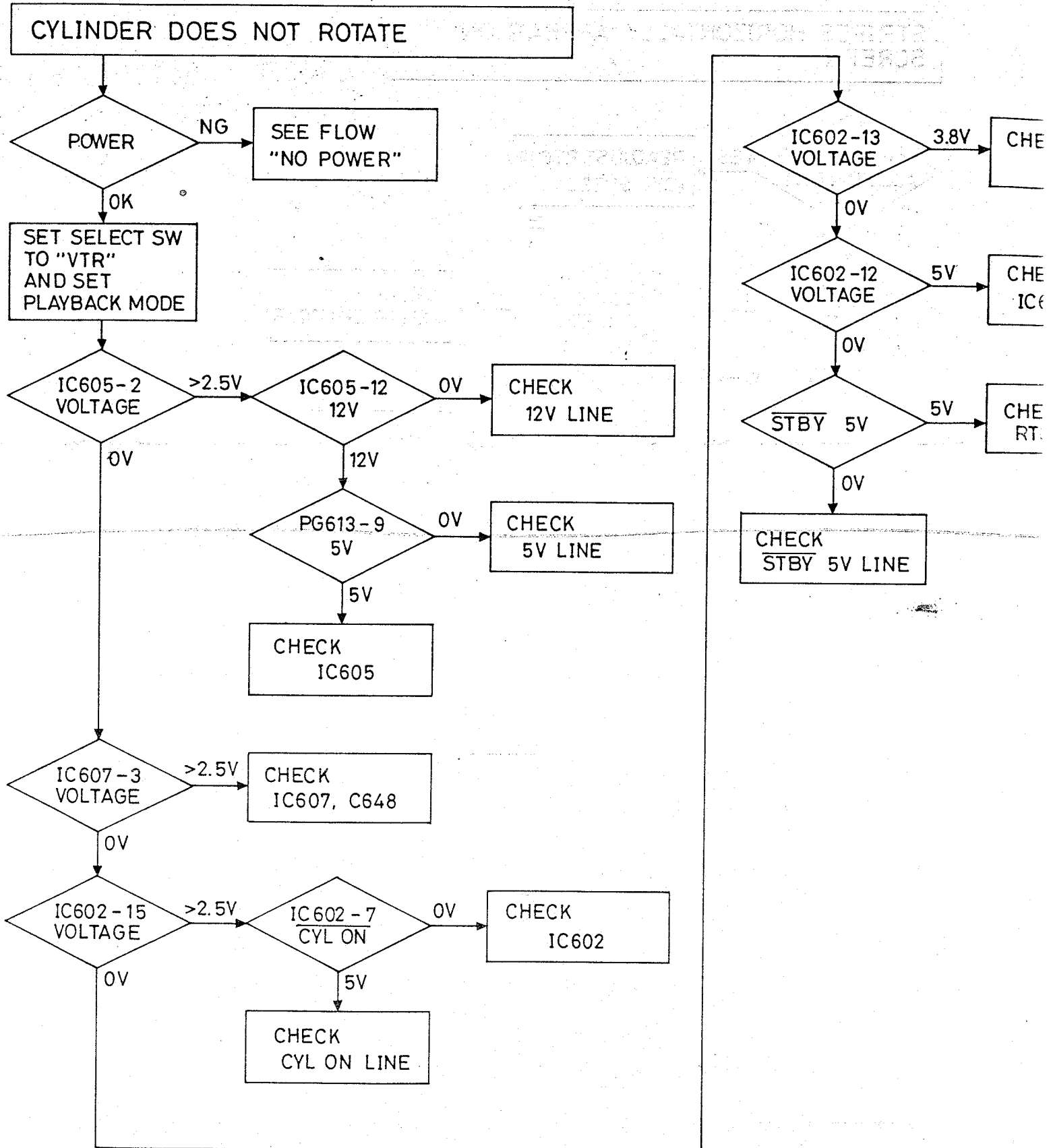
<

<

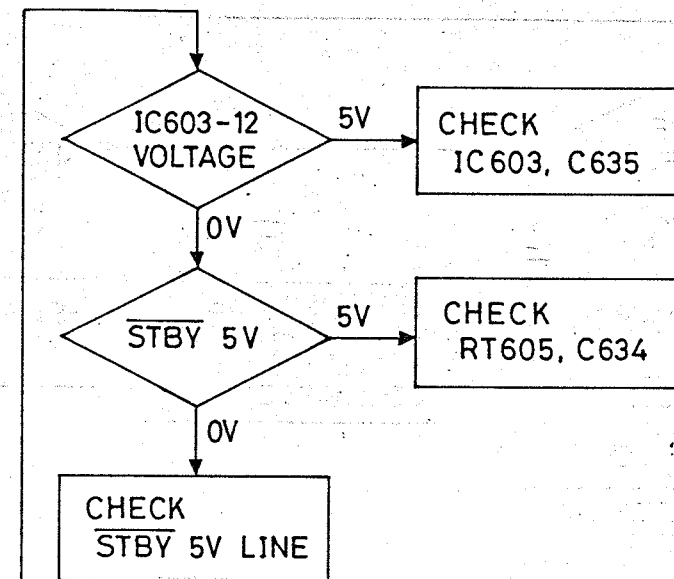
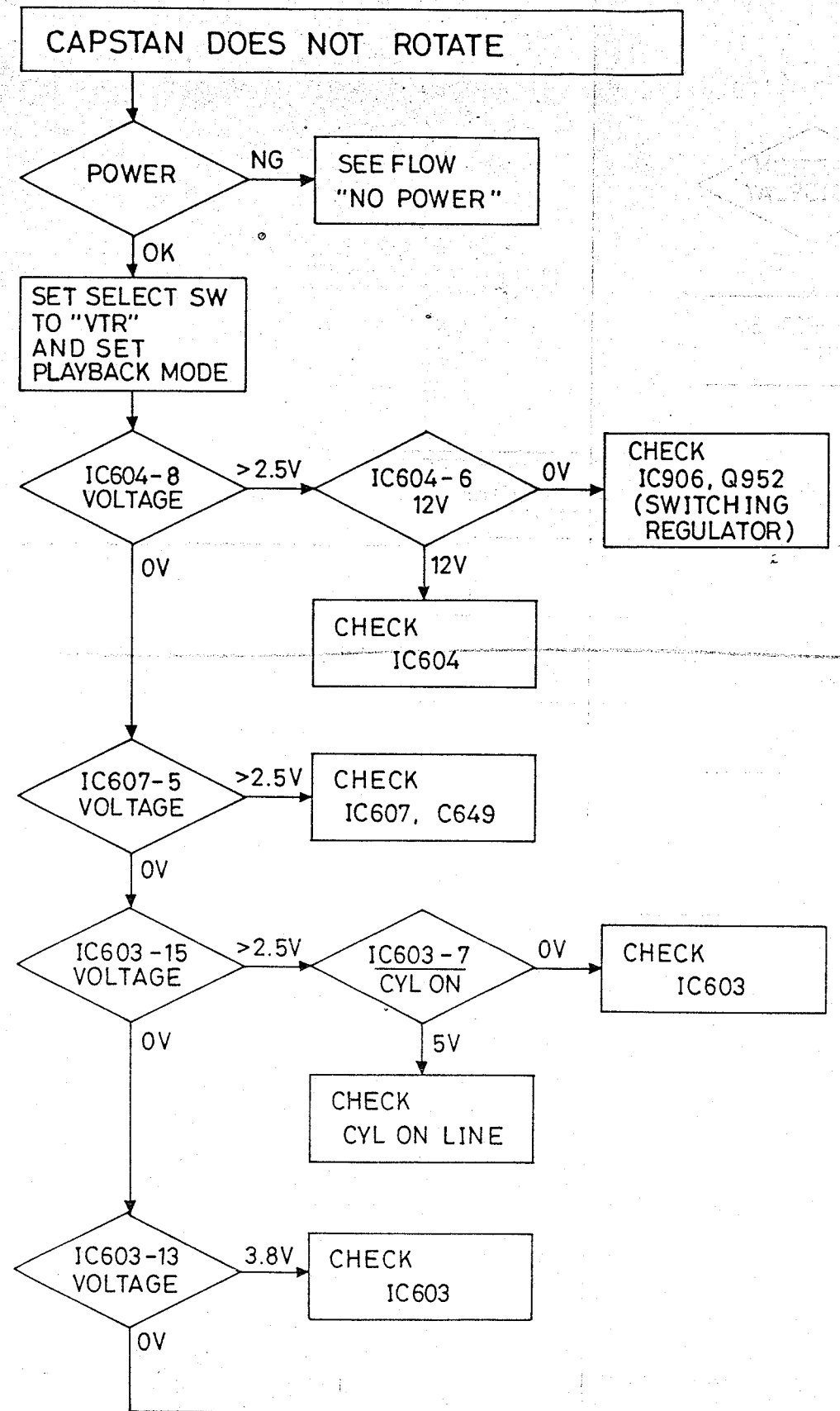
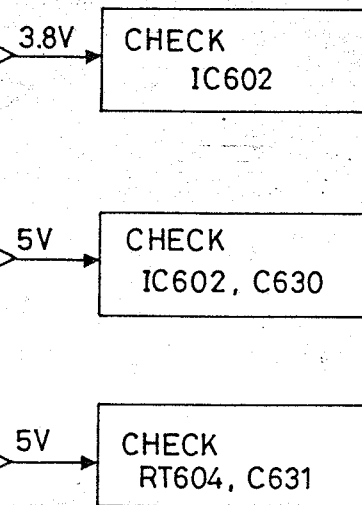
26. Stripes horizontally appear on screen



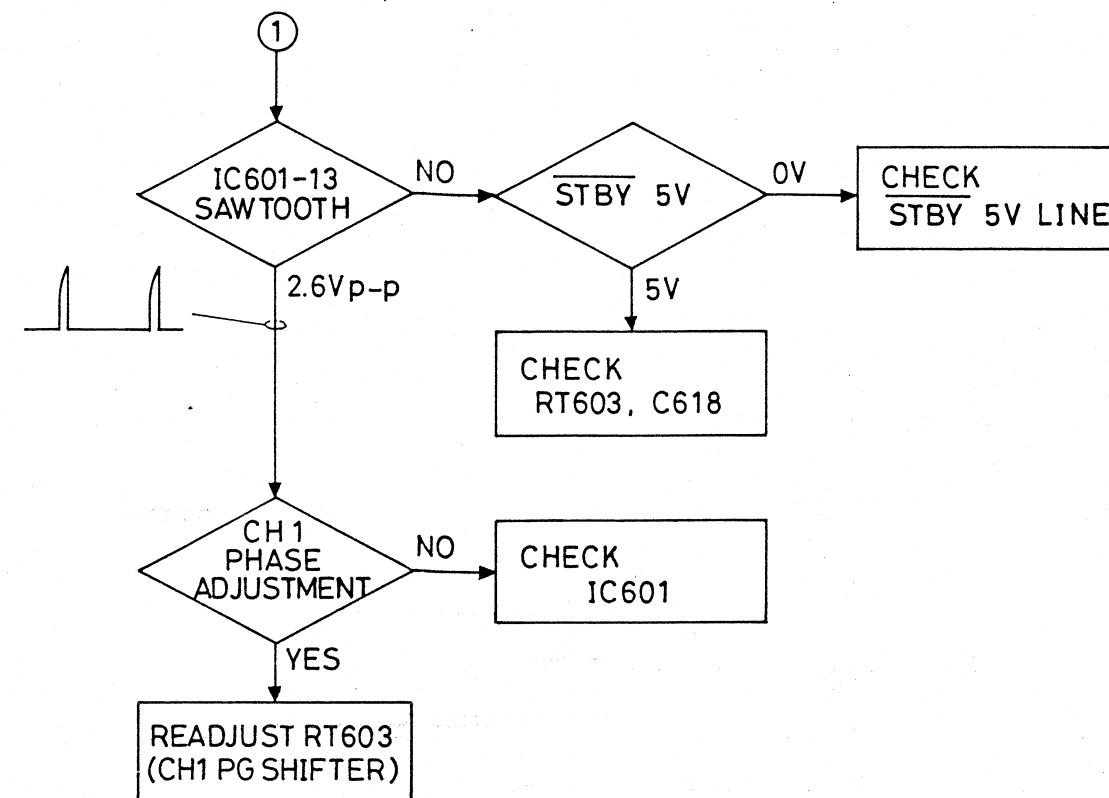
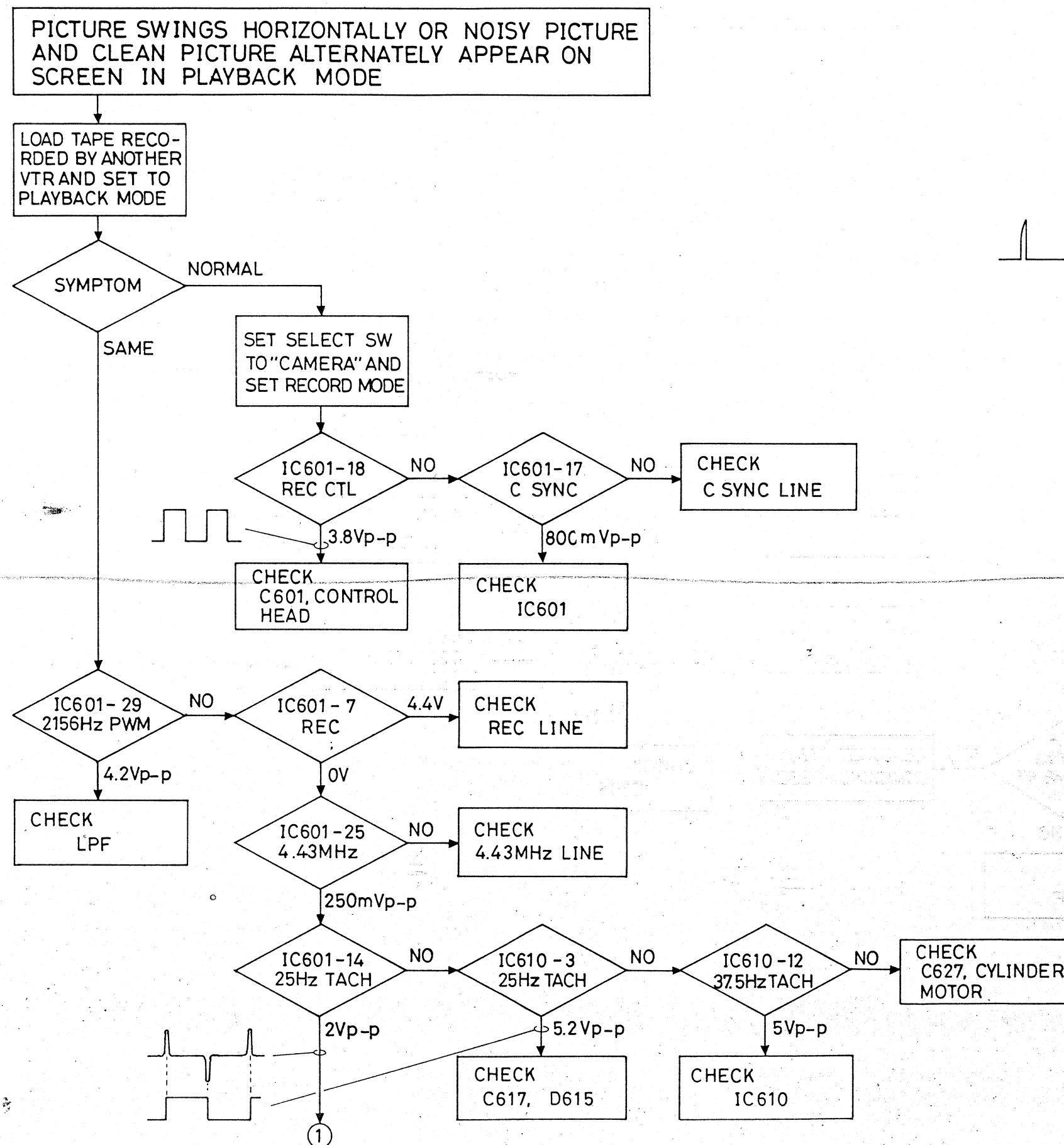
27. Cylinder does not rotate



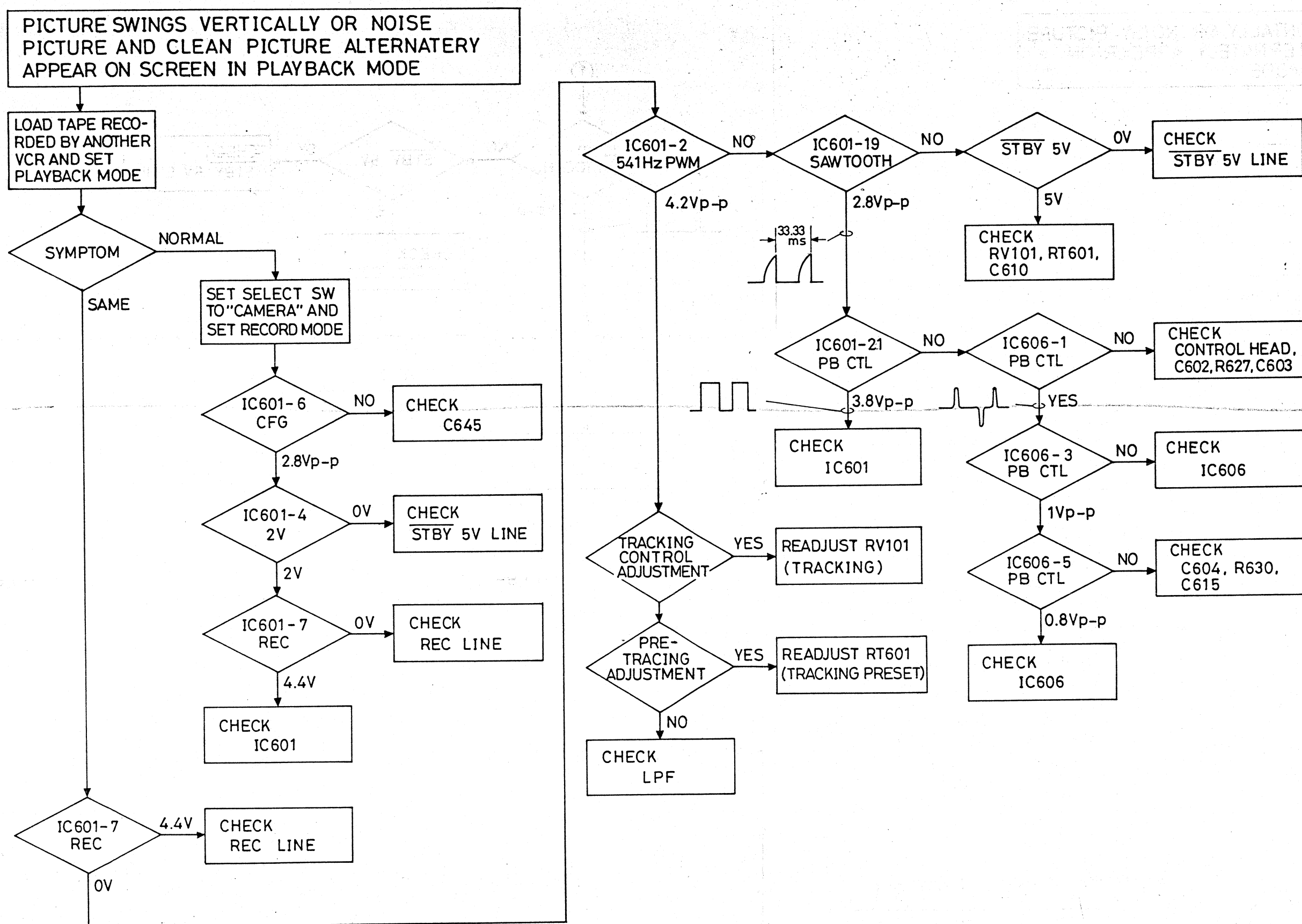
28. Capstan does not rotate



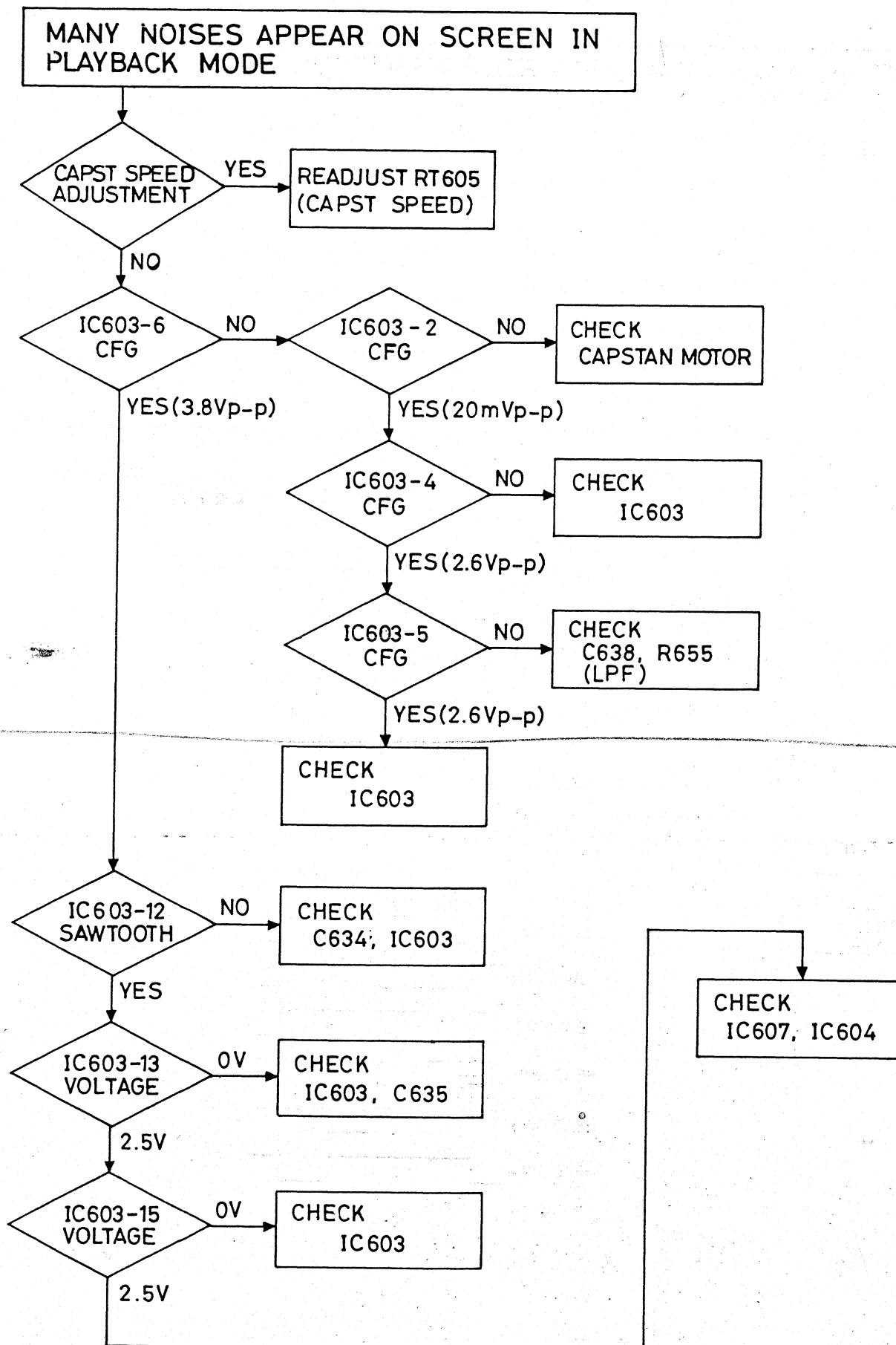
29. Picture swings horizontally or noise picture and clean picture alternately appear on screen in playback mode



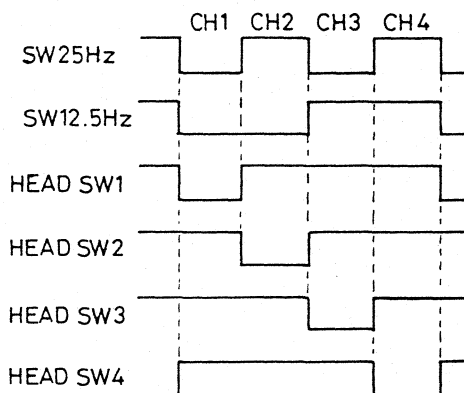
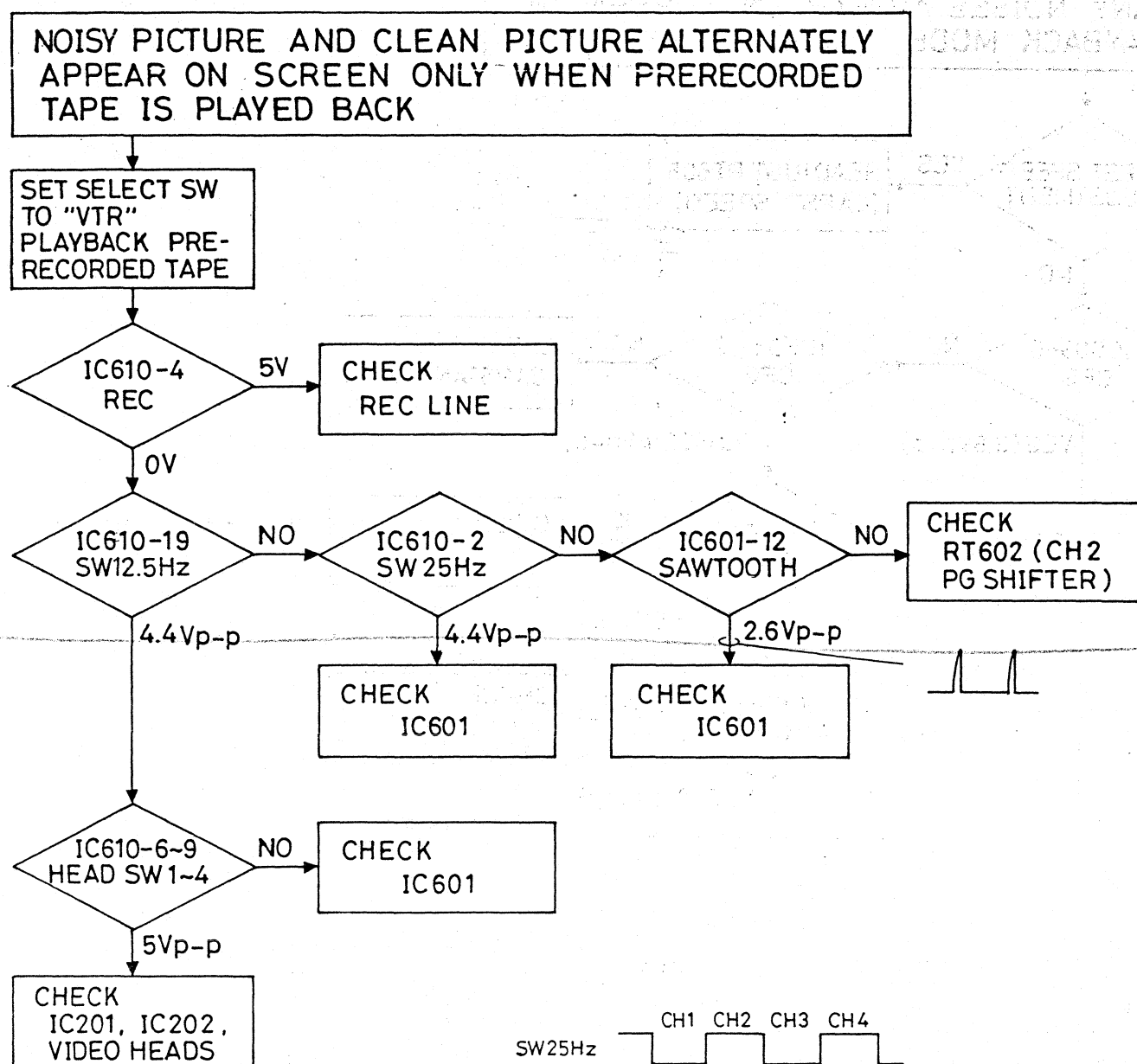
30. Picture swings vertically or noise picture and clean picture alternately appear on screen in playback mode



31. Many noise appear on screen in playback mode

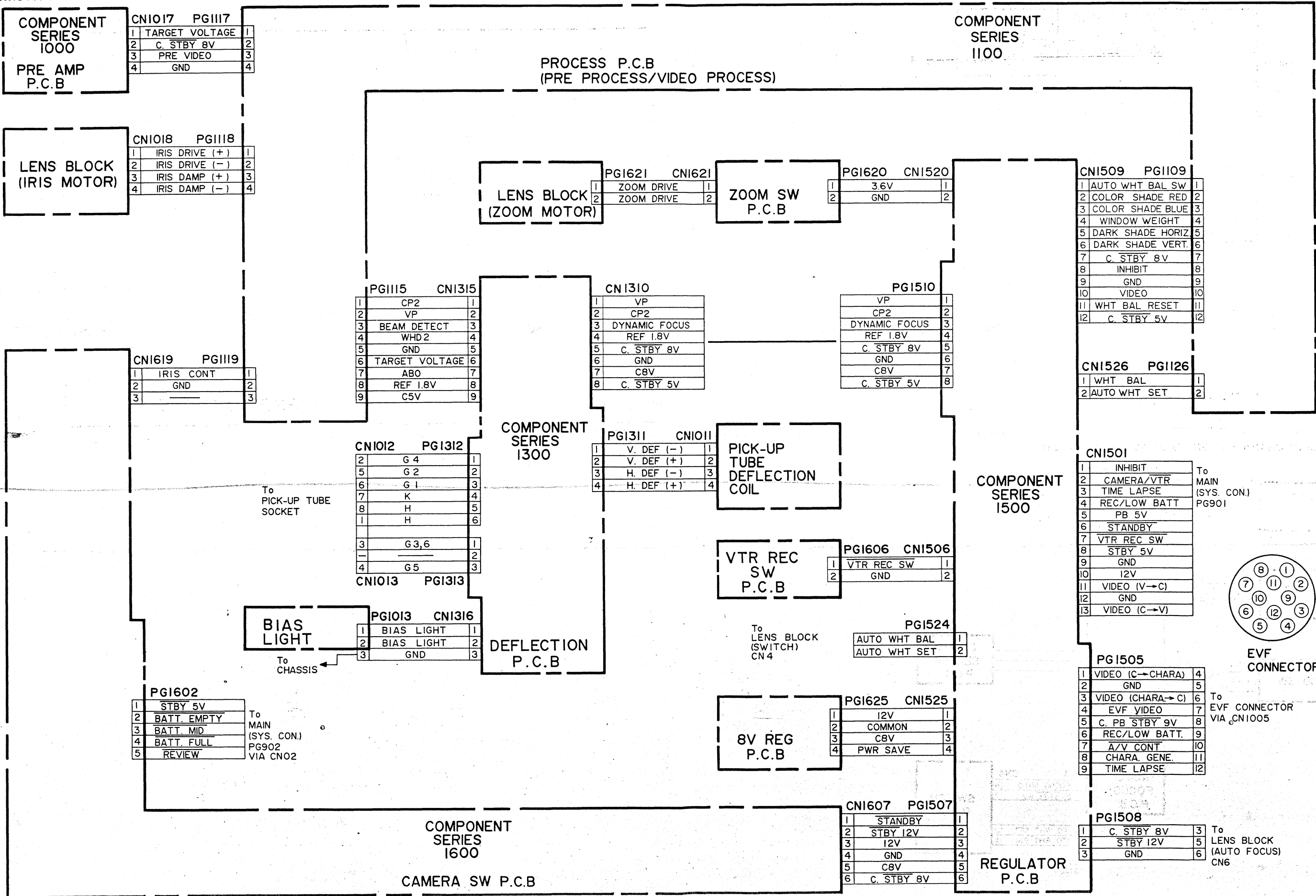


32. Noisy picture and clean picture alternately appear on screen only when prerecorded tape is played back

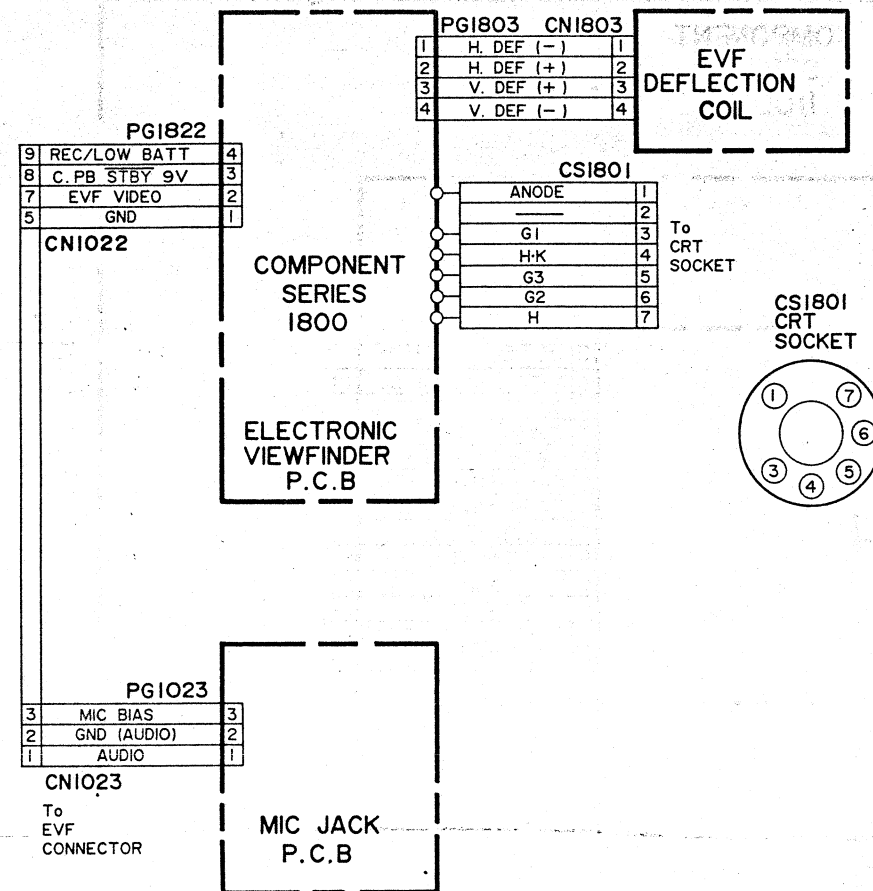


BLOCK DIAGRAMS

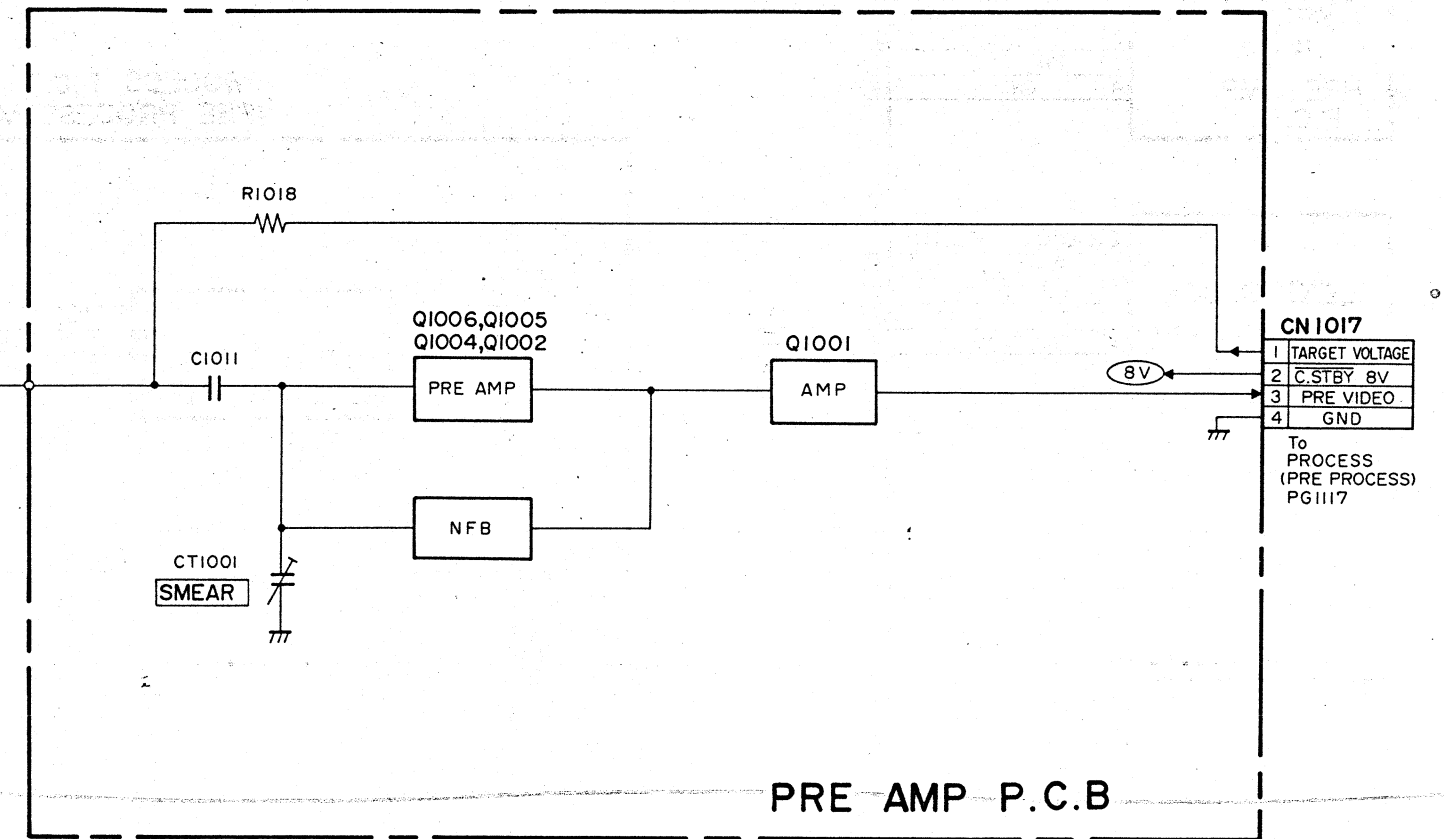
• CIRCUIT BOARD CONNECTION DIAGRAM (CAMERA)



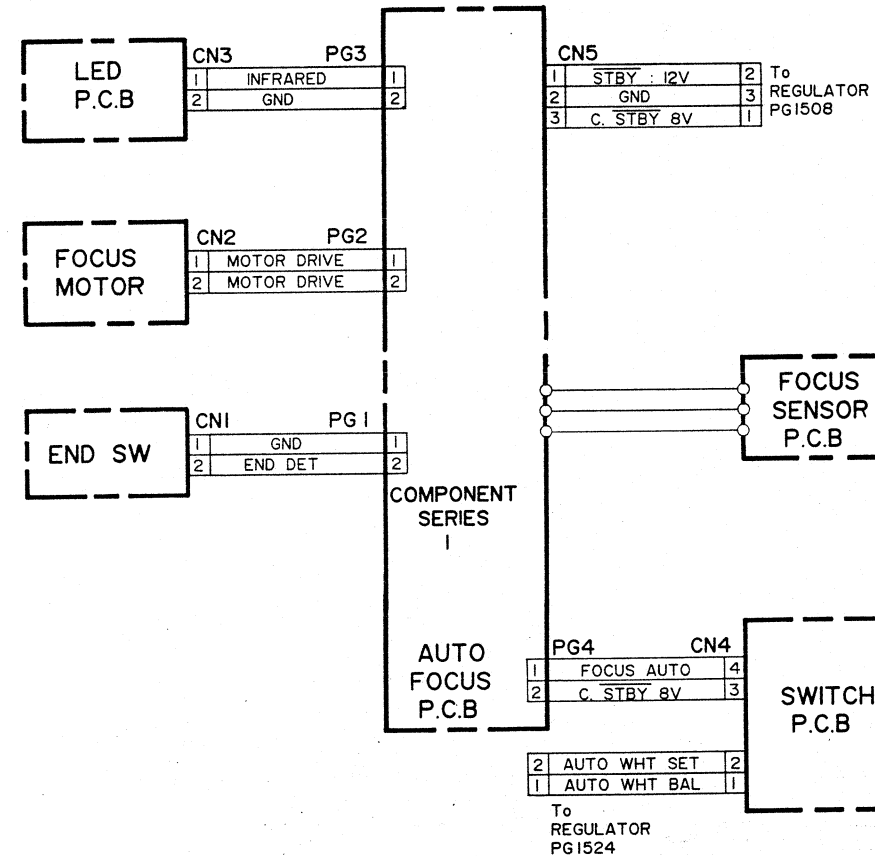
• CIRCUIT BOARD CONNECTION DIAGRAM (EVF)



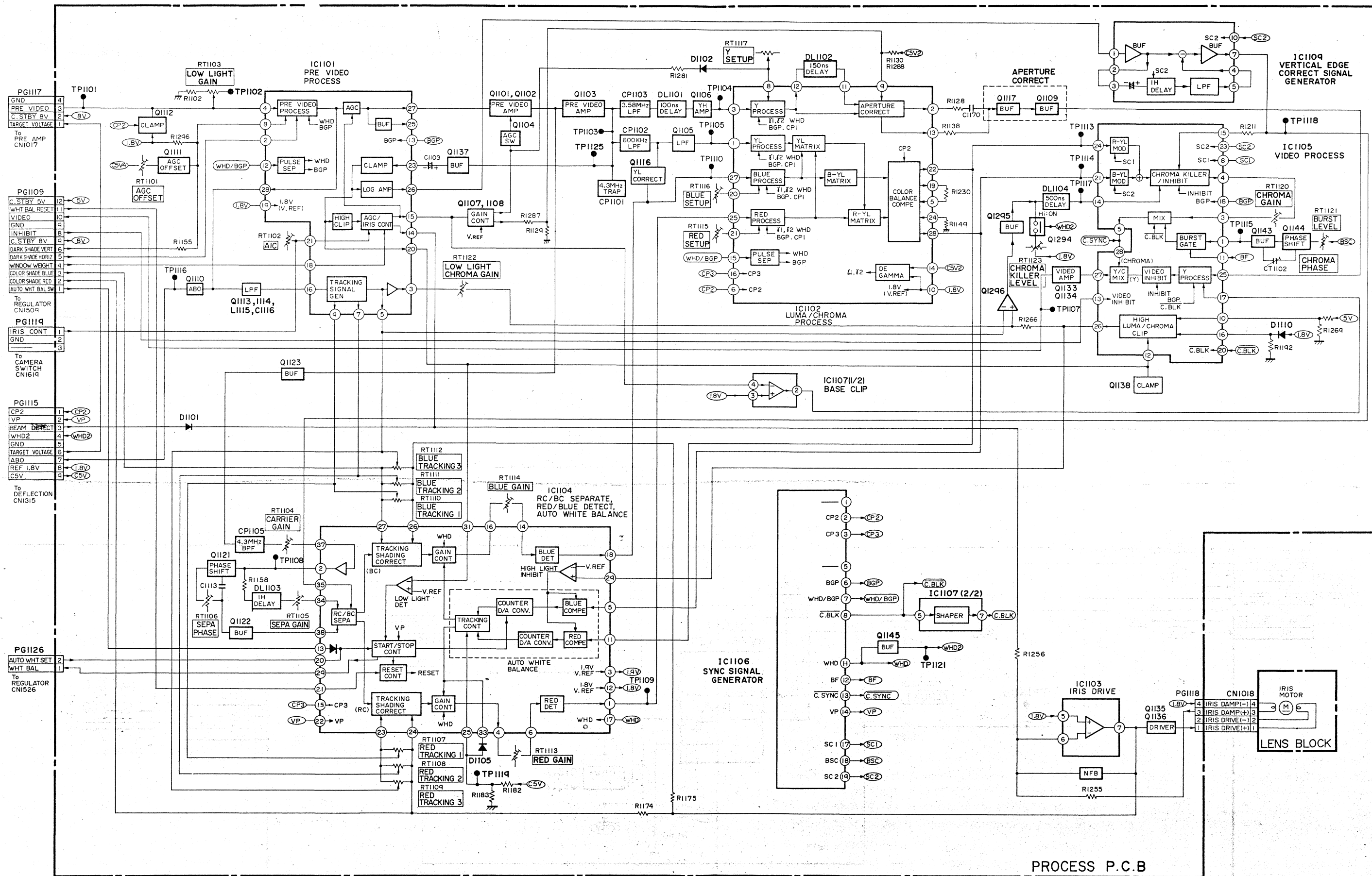
• PRE AMP BLOCK DIAGRAM



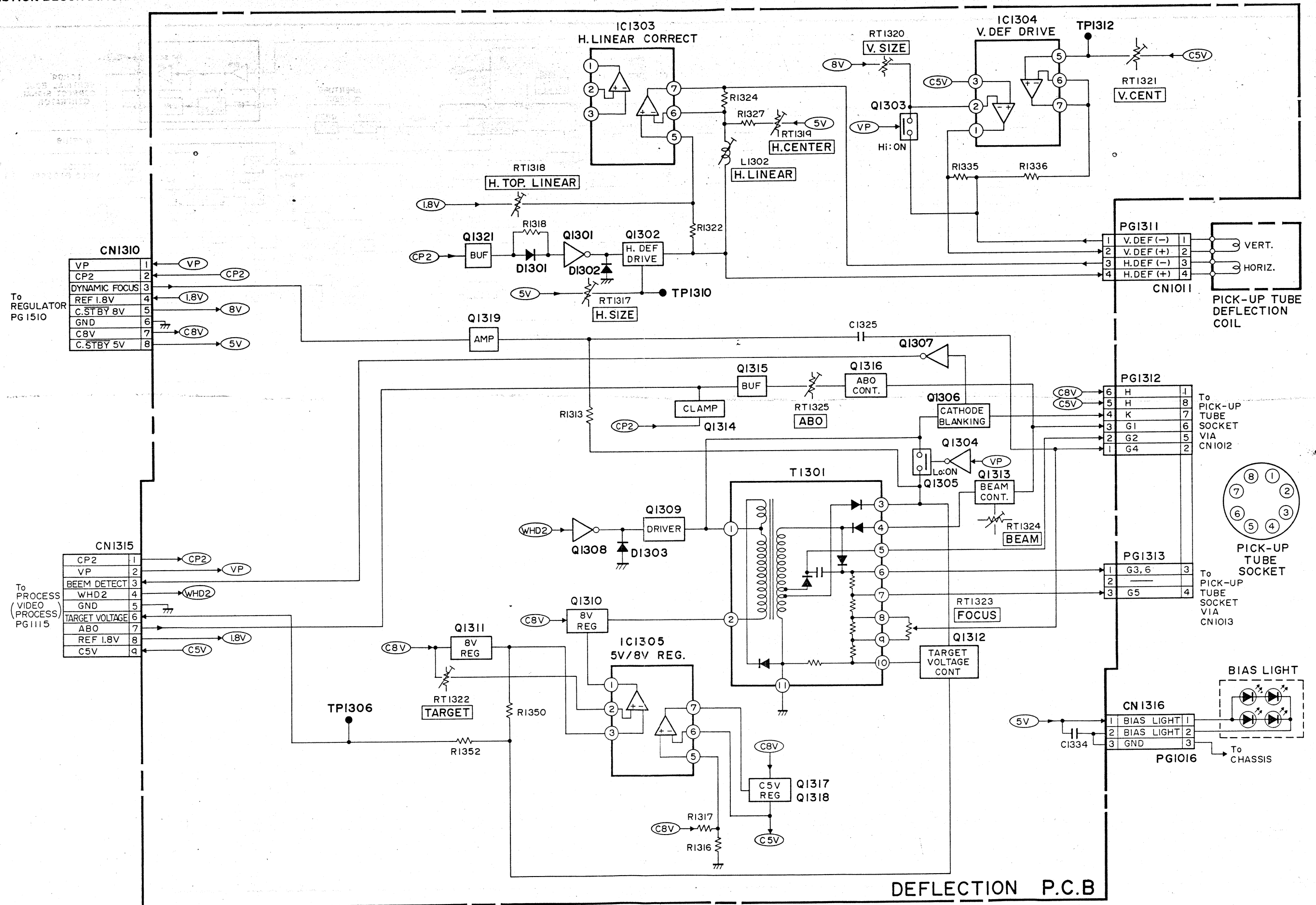
• CIRCUIT BOARD CONNECTION DIAGRAM (AUTO FOCUS)



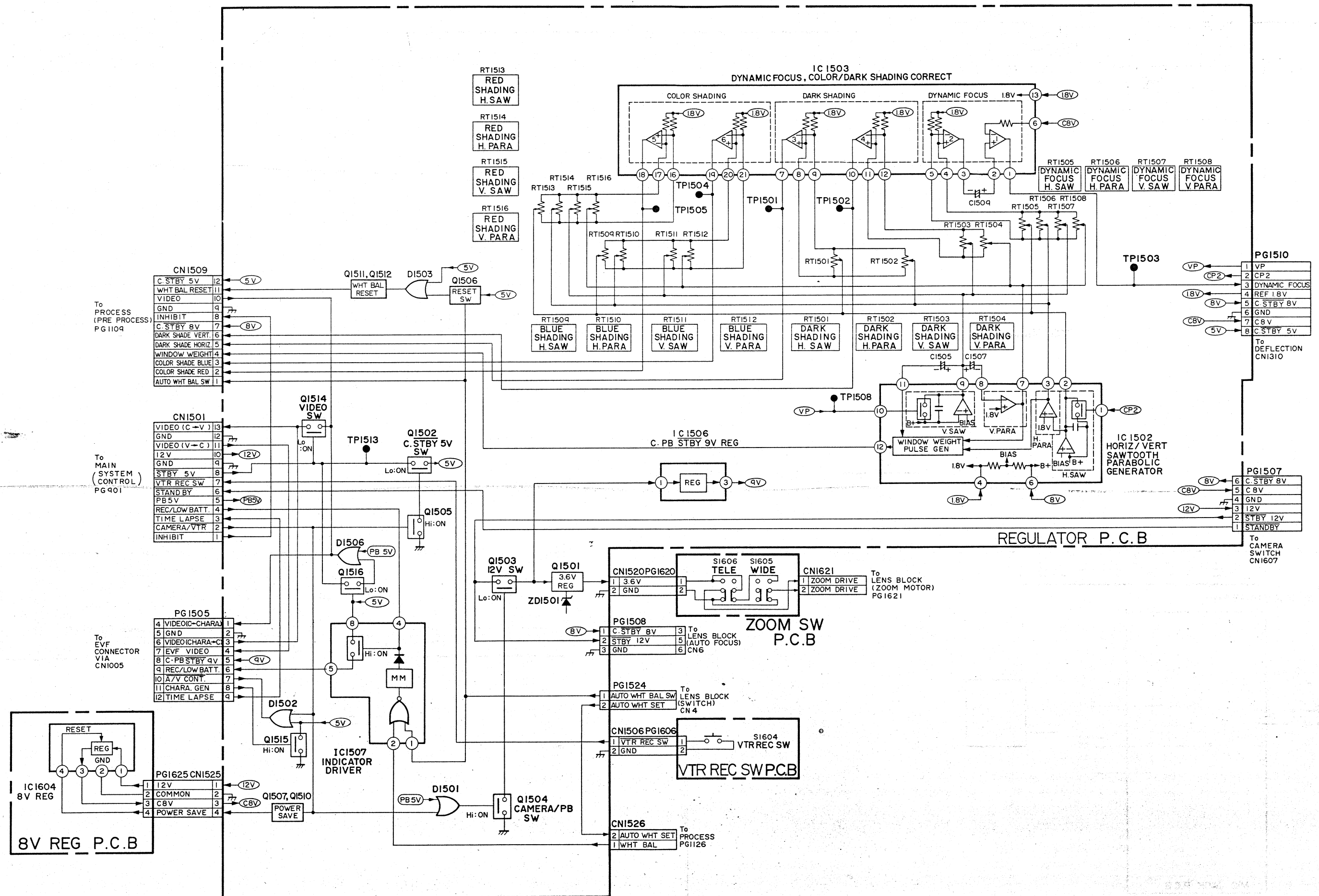
- **PROCESS BLOCK DIAGRAM**



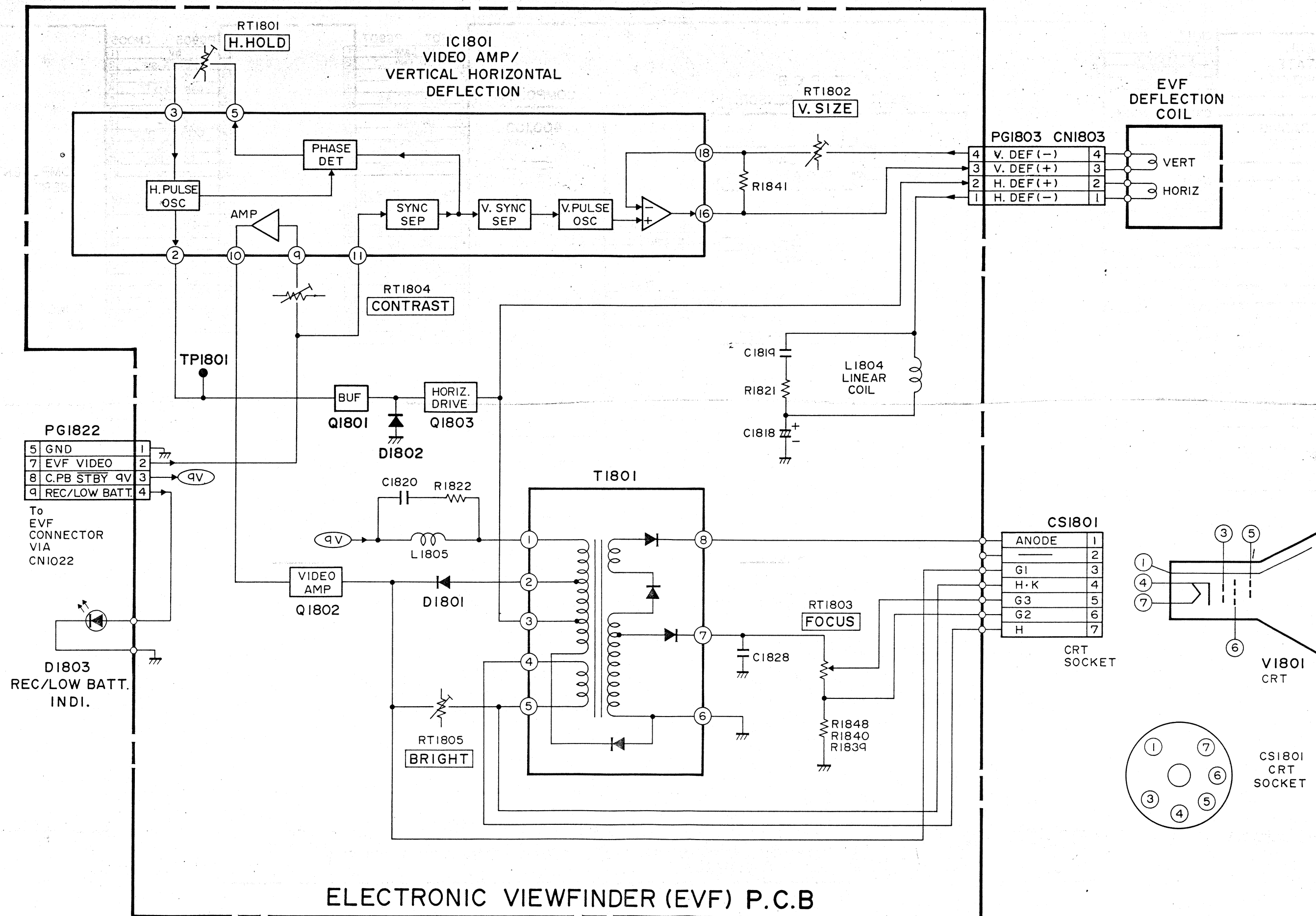
• DEFLECTION BLOCK DIAGRAM

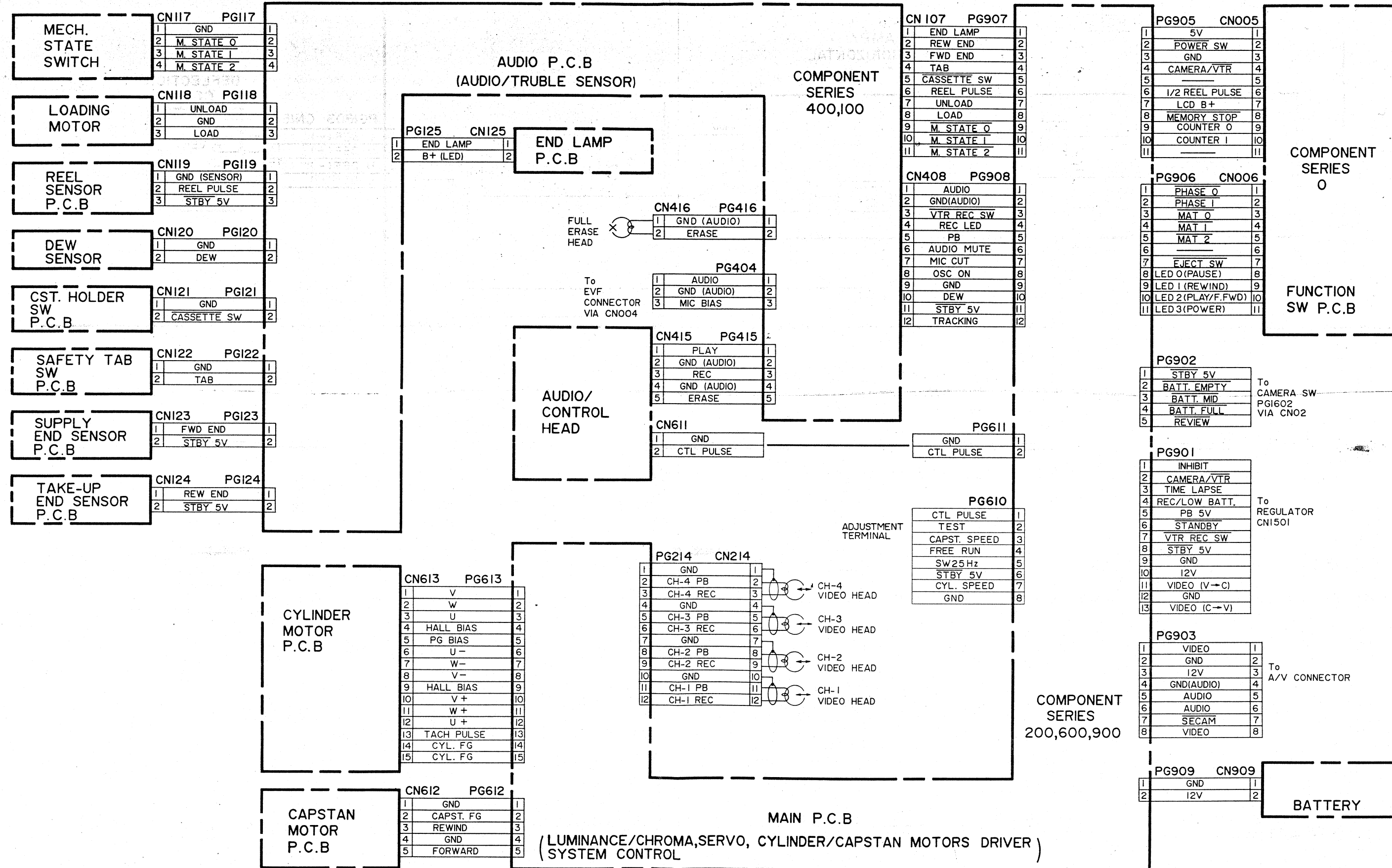


• REGULATOR. 8V REG. ZOOM SW. VTR REC SW BLOCK DIAGRAM

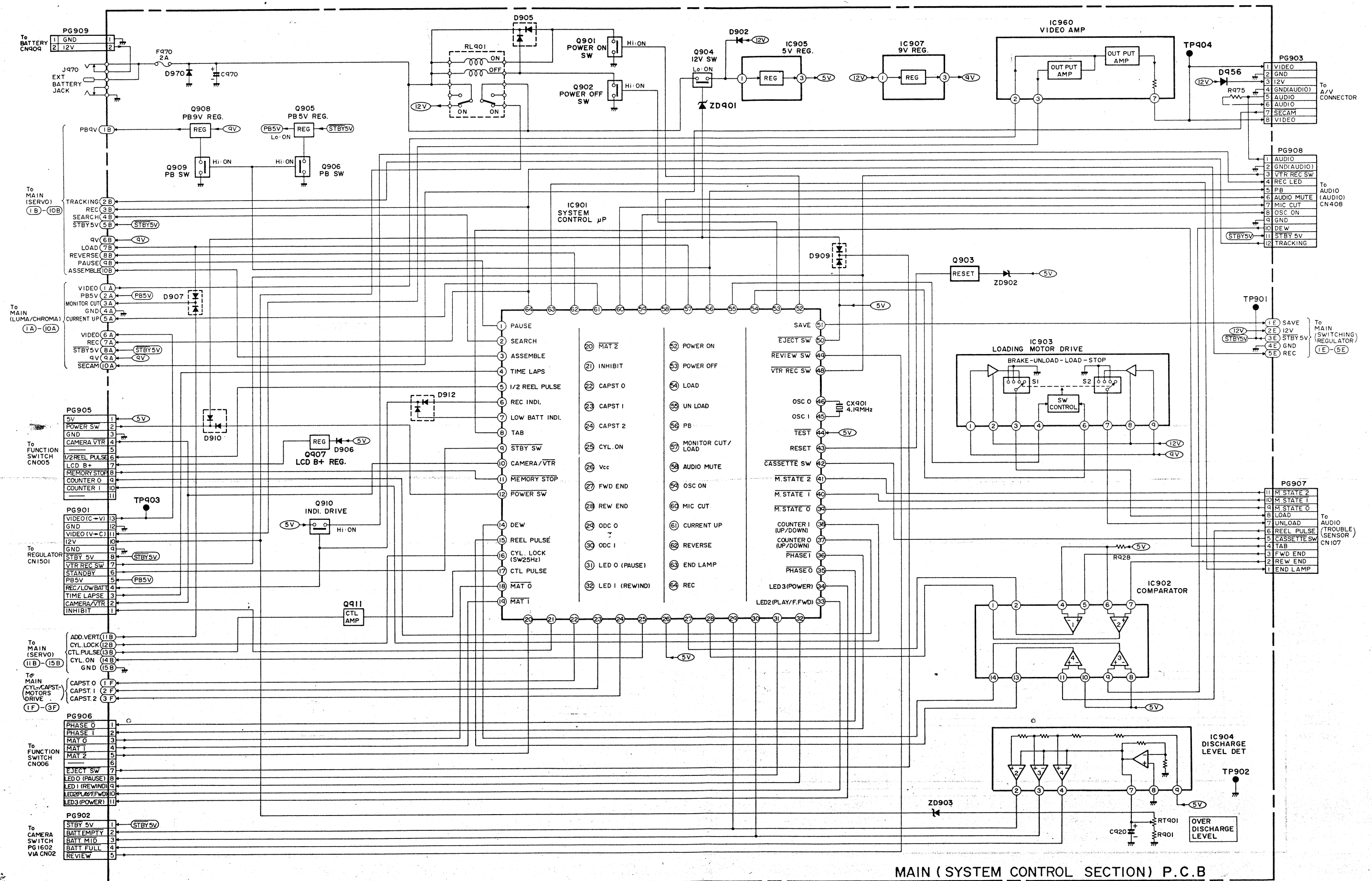


• ELECTRONIC VIEWFINDER (EVF) BLOCK DIAGRAM

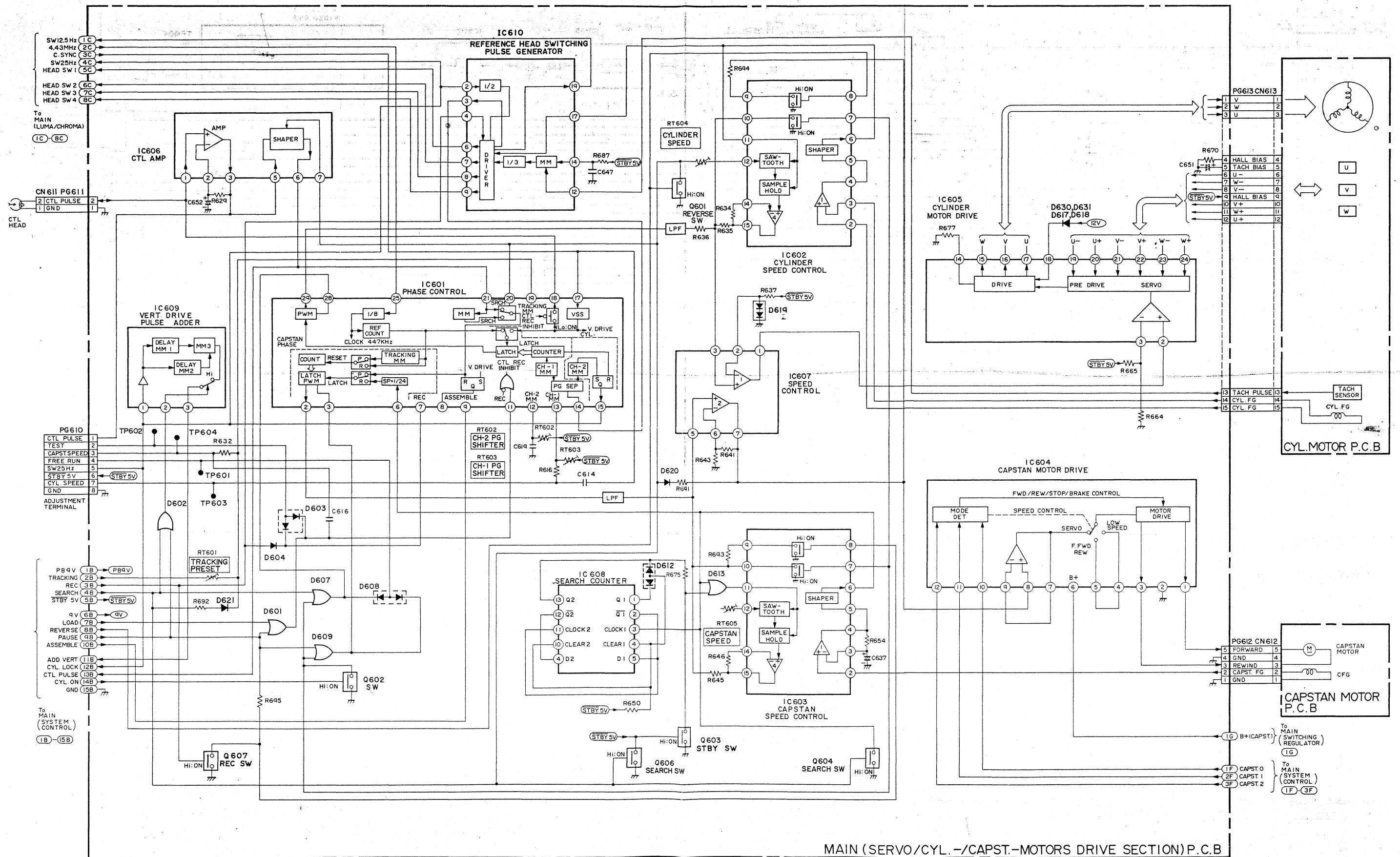




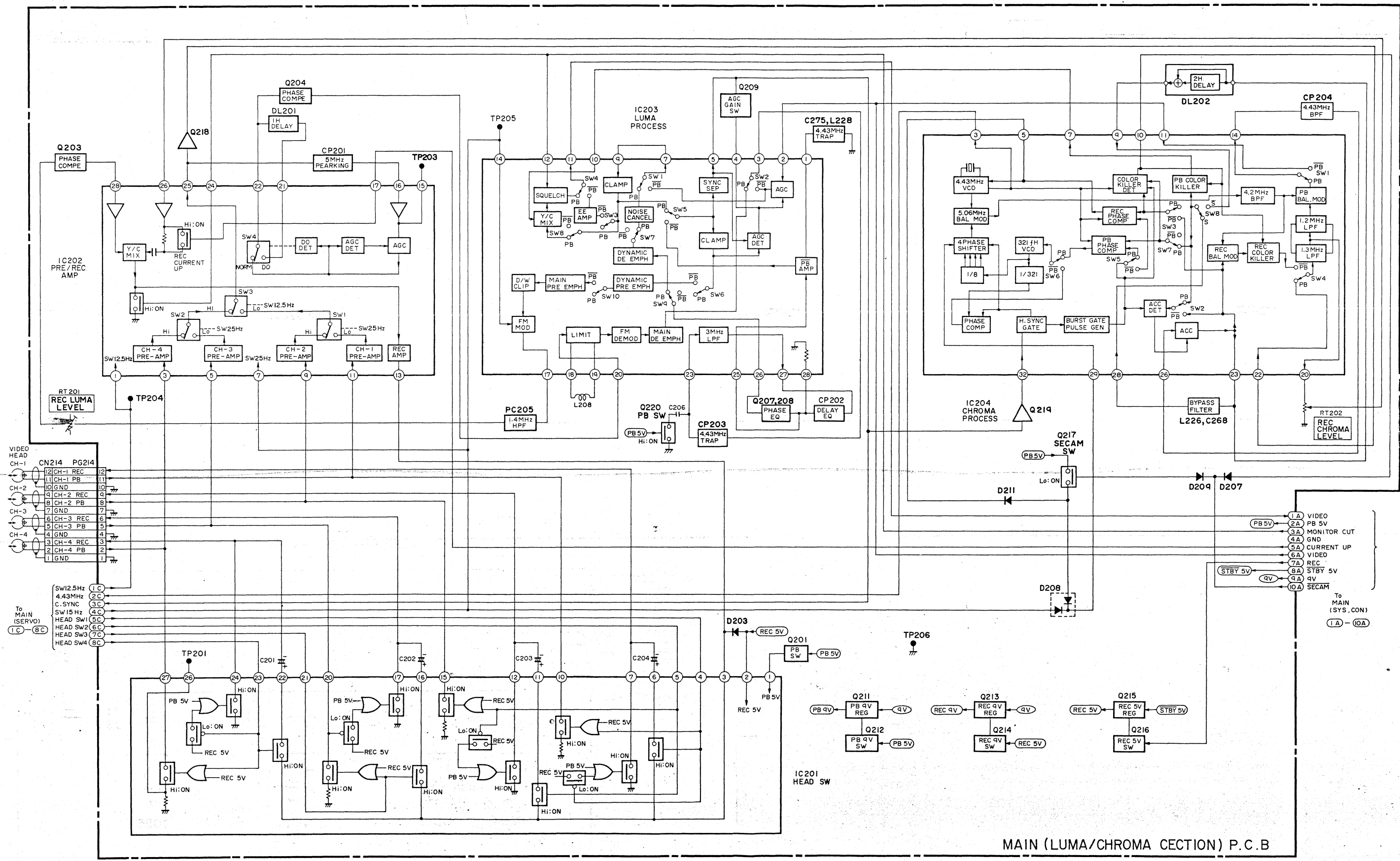
• SYSTEM CONTROL BLOCK DIAGRAM



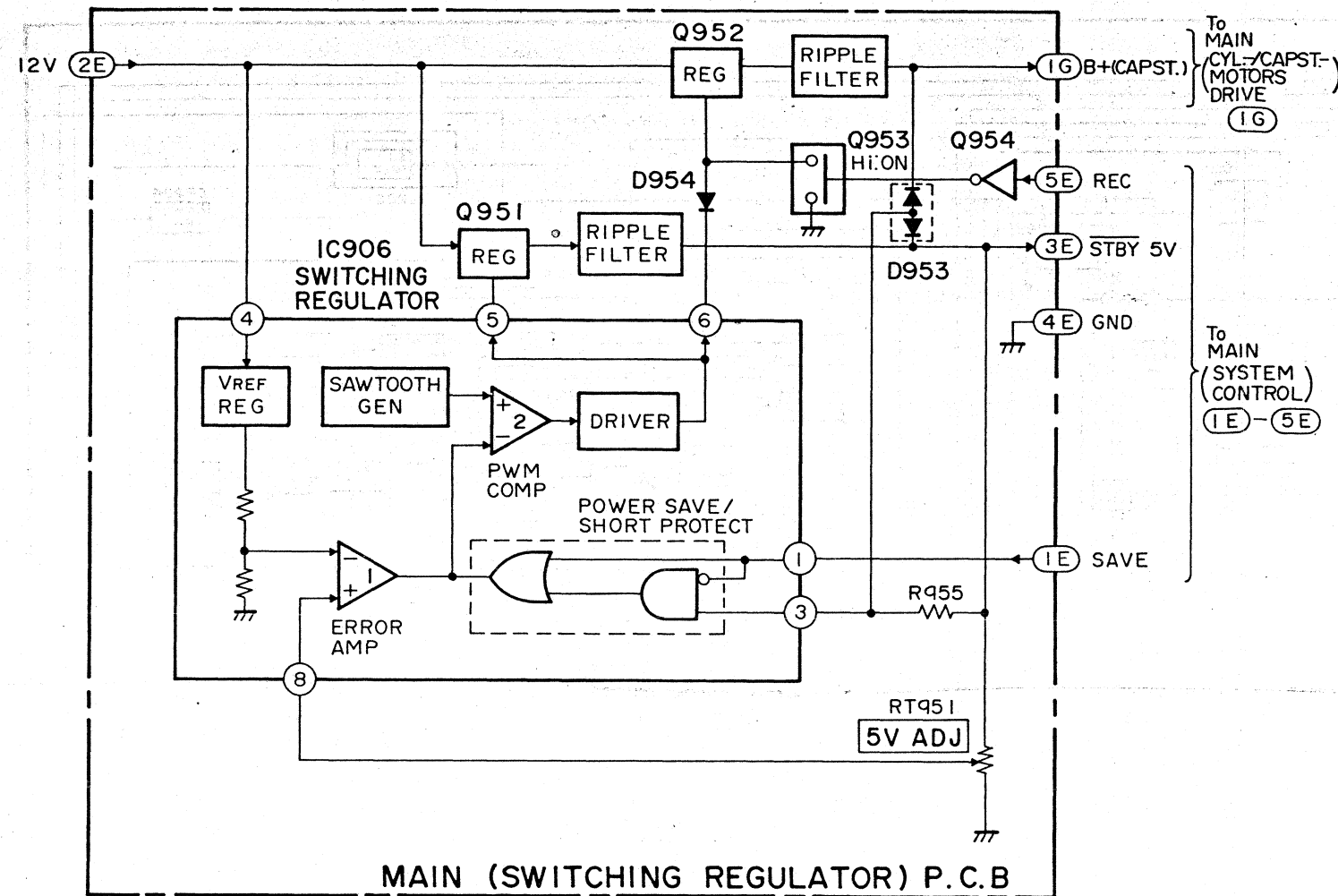
• SERVO. CYL.-/CAPST.- MOTORS DRIVE BLOCK DIAGRAM



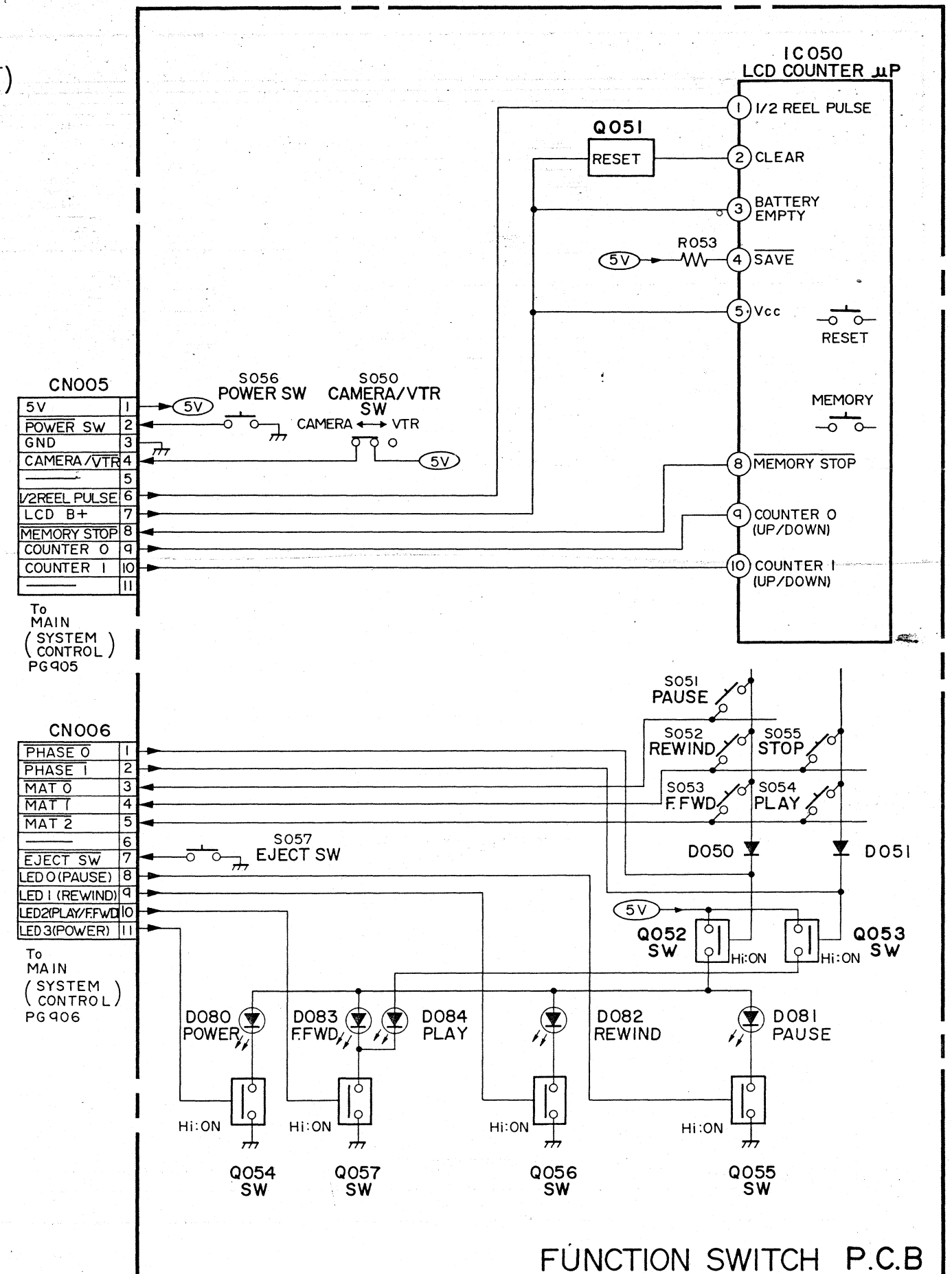
LUMA/CHROMA BLOCK DIAGRAM



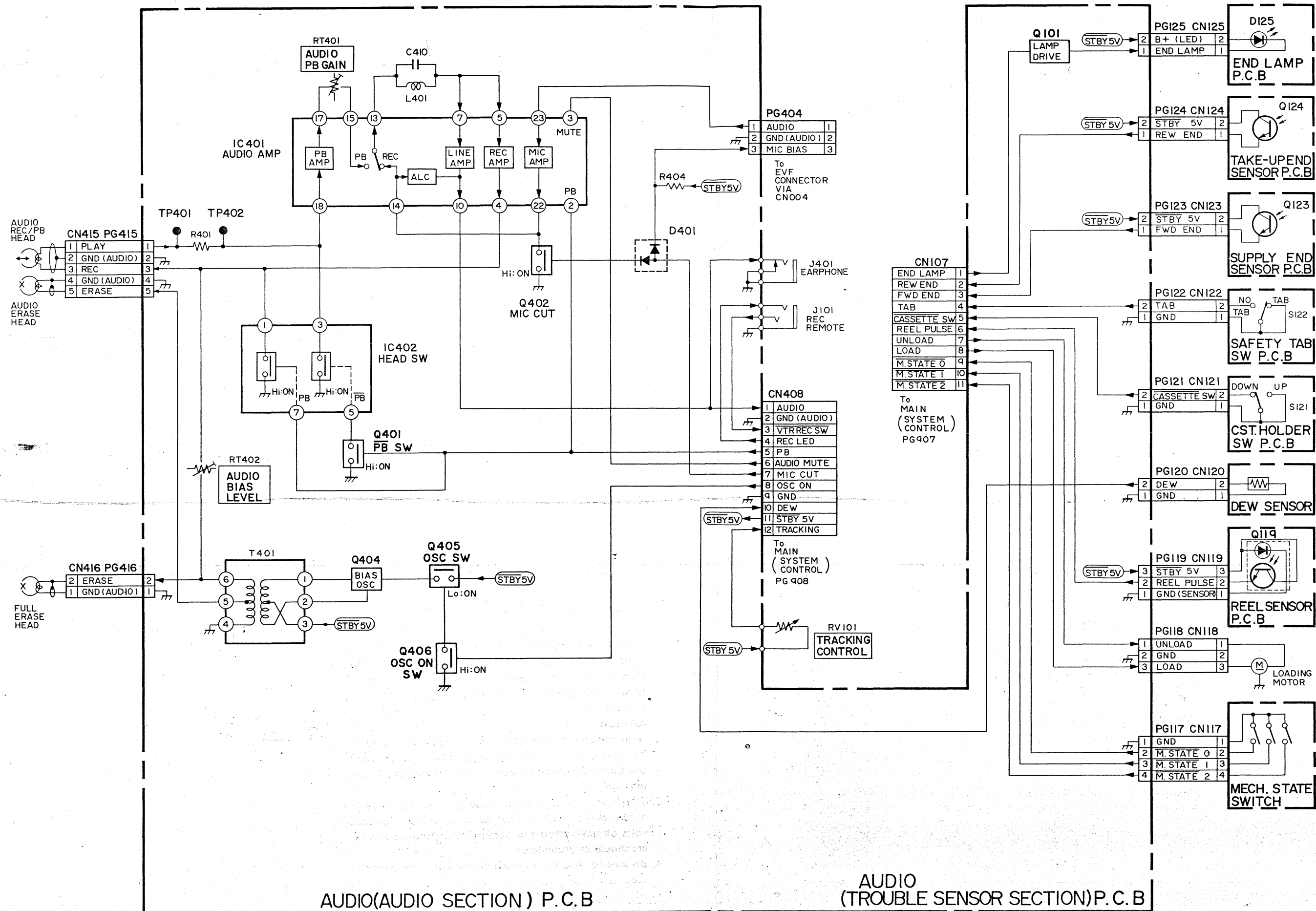
• SWITCHING REGULATOR BLOCK DIAGRAM



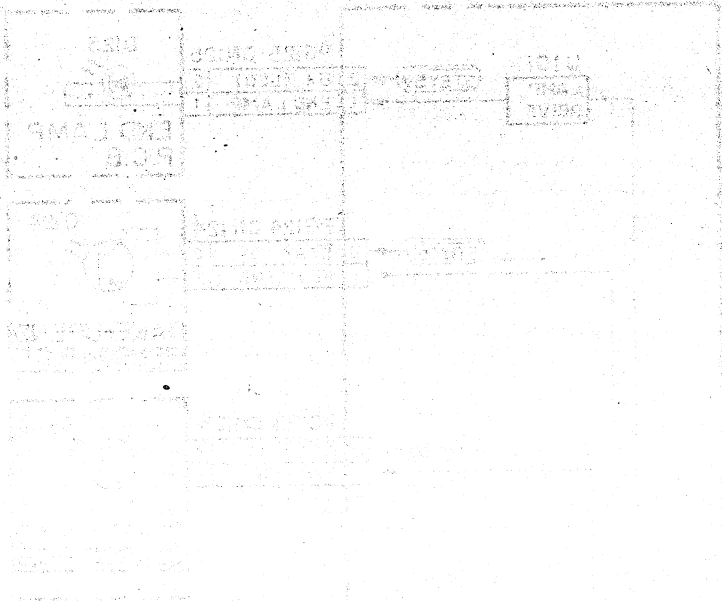
• FUNCTION SW BLOCK DIAGRAM



• AUDIO TROUBLE SENSOR BLOCK DIAGRAM



MEMO



SCHEMATIC DIAGRAMS AND CIRCUIT BOARD DIAGRAMS

WHEN USING THIS SERVICE REFERENCE MATERIAL

1. How to read abbreviations

Note

- 1. Voltage measured at base of chassis with minimum volume control and no signal.
- 2. Nomenclature of Resistors and Capacitors.

	Circuit No.	
	Value	No indicated Ω (Ohm) M : 1000kΩ
	Tolerance	No indicated ± 5% K : ± 10% M : ± 20%
	Wattage	No indicated ¼ W
	Sort	No indicated Carbon film
		RC : Composition
		RW : Wire wound
		RS : Oxide metal film
		RN : Fixed metal film

	Circuit No.	
	Value	No indicated μ F P : PF
	Tolerance	No indicated ± 10% J : ± 5% M : ± 20% Z : ± 80% - 20% D : ± 0.5pF C : ± 0.25pF
	Sort	⊕ ⊖ Ceramic ⊕ ⊖ Electrolytic M ⊕ ⊖ Mylar P ⊕ ⊖ Polyester S ⊕ ⊖ Styrol
	Voltage	No indicated 50WV

- 3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.

3. How to read capacity and inductance of resistor shape capacitors and coils

CAPACITOR

CAPACITY: (10A+B)×C [PF]
TOLERANCE: D
RATED VOLTAGE: BODY COLOR
Pink: 25V
Green: 50V
CHARACTERISTICS: E

COIL

INDUCTANCE: (10A+B)×C [μH]

COLOR	A, B	C	D	E
Black	0	10 ⁰	±20%	For temperature compensation
Brown	1	10 ¹		
Red	2	10 ²		
Orange	3	10 ³		
Yellow	4	10 ⁴		
Green	5	10 ⁵		
Blue	6			
Violet	7			
Grey	8		±30%	High dielectric constant type
White	9			For temperature compensation
Gold		10 ⁻¹	± 5%	
Silver		10 ⁻²	±10%	High dielectric constant type

2. Cautions on use of MOS IC

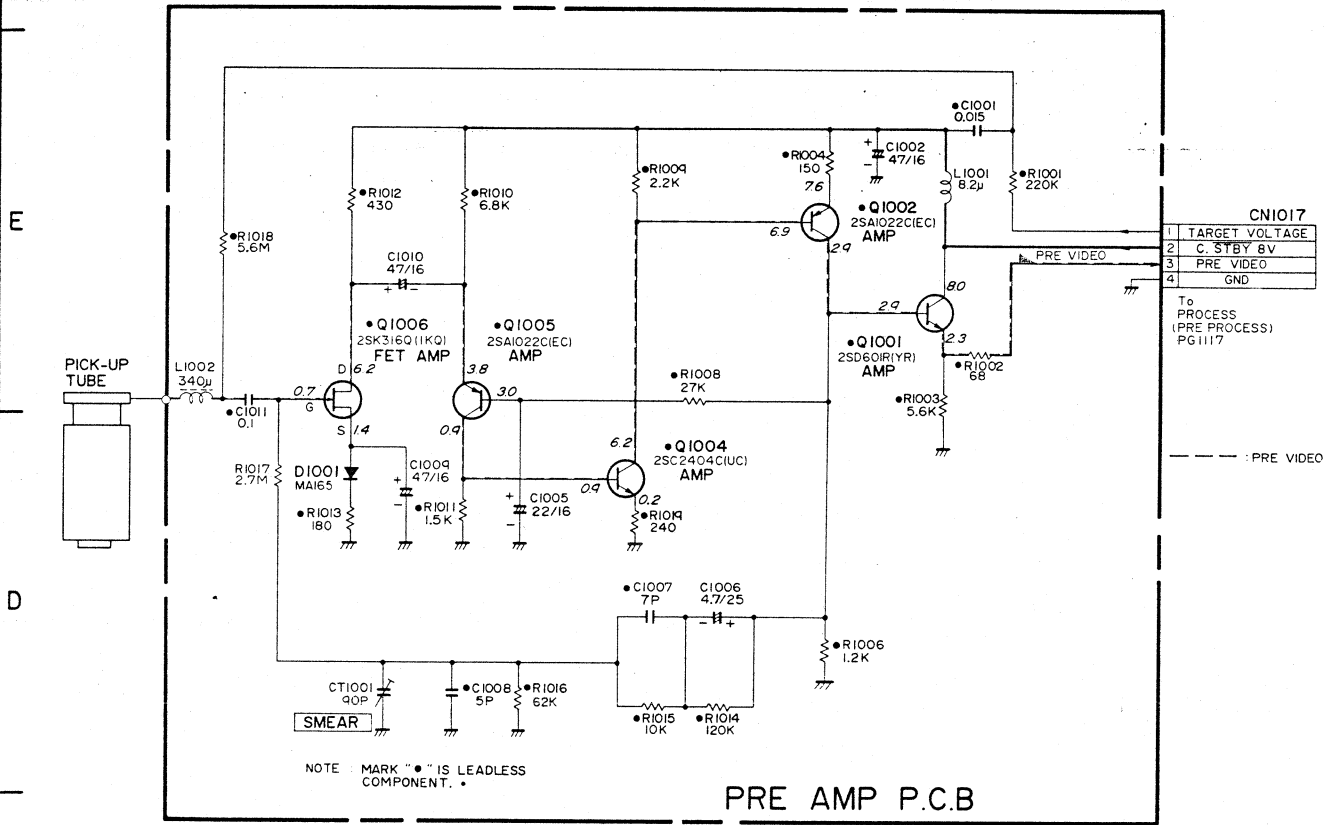
- 1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
- 2. High voltages may be applied during doldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
- 3. The human body, clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a work-ers should be grounded.
- 4. Be sure to ground measuring instruments such as oscillo-scopes, VTVMs, etc. used for repairs.

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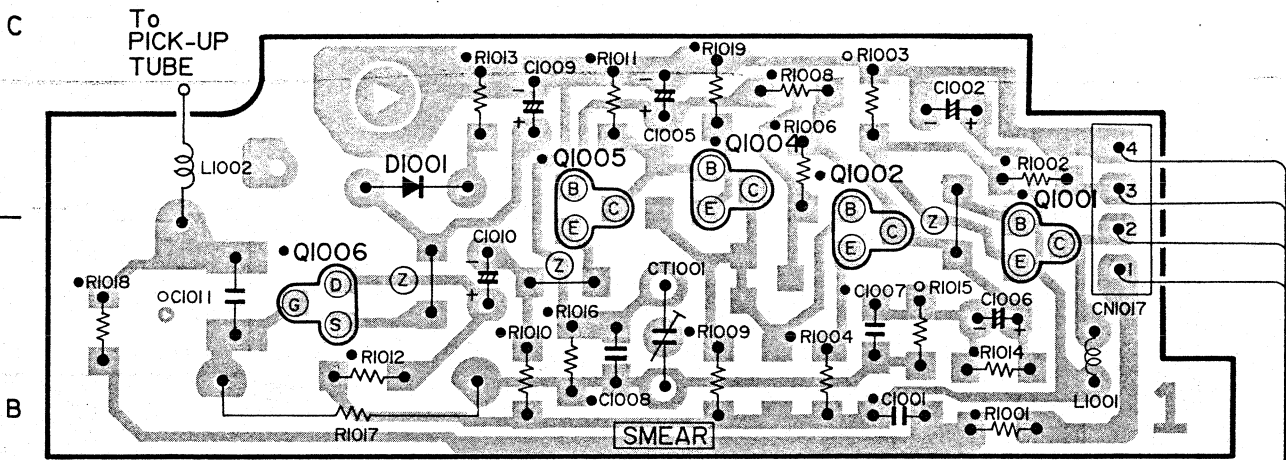
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PRE AMP SCHEMATIC DIAGRAM



VM200E PRE AMP SCHEMATIC

PRE AMP CIRCUIT BOARD DIAGRAM



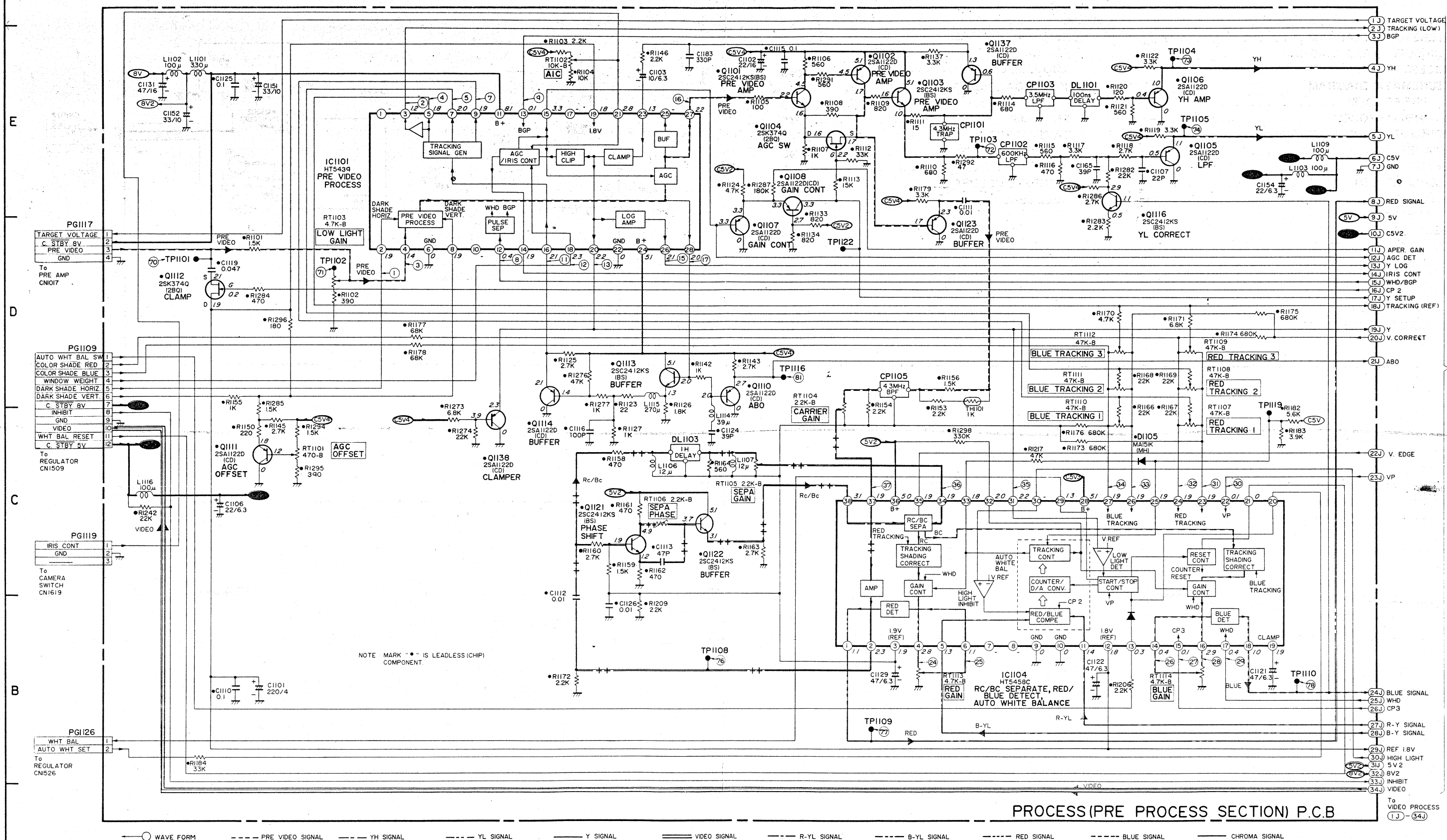
NOTE : MARK "Z" IS LEADLESS JUMPER.

PRE AMP P.C.B

Q1006		Q1005		Q1004		Q1002		Q1001		To PROCESS (PRE PROCESS) PG1117		CN1017	
D	6.2	B	3.0	B	0.9	B	6.9	B	2.9	TARGET VOLTAGE	1		
G	0.7	C	0.9	C	6.2	C	2.9	C	8.0	C. STBY 8V	2		
S	1.4	E	3.8	E	0.2	E	7.6	E	2.3	PRE VIDEO	3		
										GND	4		

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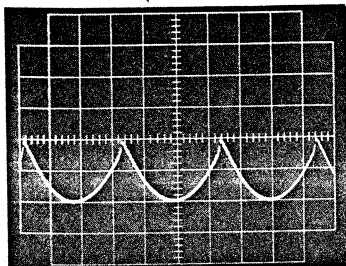
PROCESS (PRE PROCESS) SCHEMATIC DIAGRAM



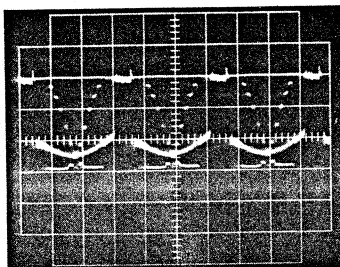
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PROCESS WAVEFORMS

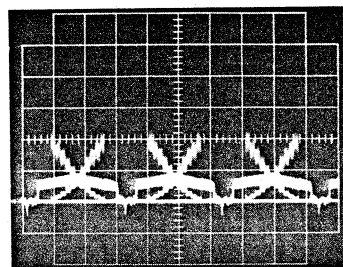
1-A IC1101-2
50 mV/20 μ sec. cm



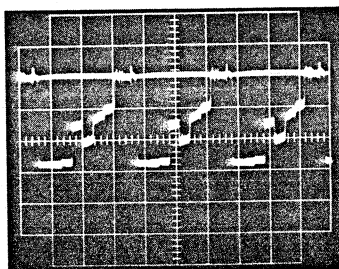
2-A IC1101-3
50 mV/20 μ sec. cm



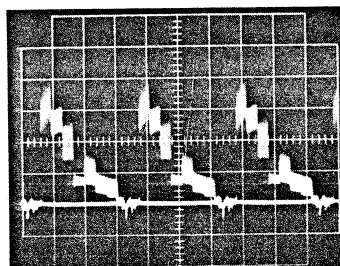
3-A IC1101-4
0.1V/20 μ sec. cm



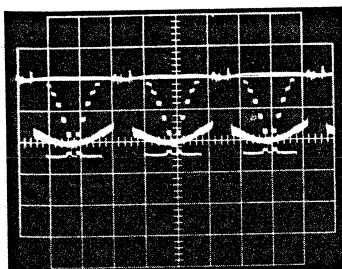
2-B IC1101-3 (Colour bar)
50 mV/20 μ sec. cm



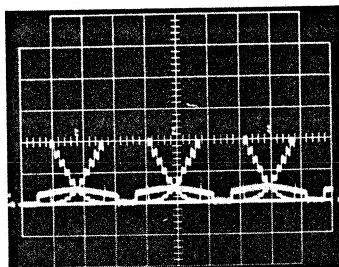
3-B IC1101-4 (Colour bar)
50 mV/20 μ sec. cm



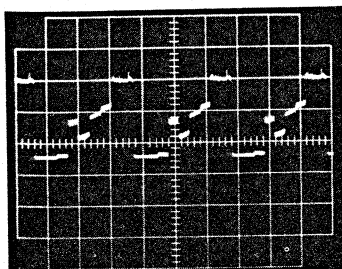
4-A IC1101-5
0.1V/20 μ sec. cm



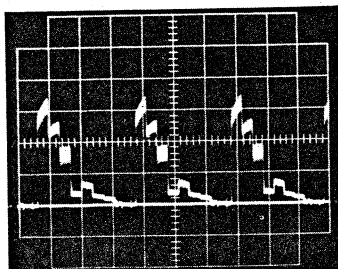
5-A IC1101-7
0.2V/20 μ sec. cm



4-B IC1101-5 (Colour bar)
0.1V/20 μ sec. cm

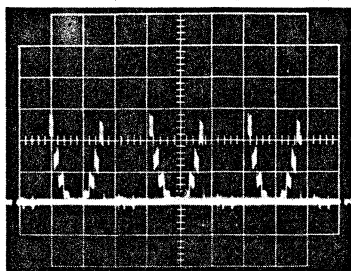


5 B IC1101-7 (Colour bar)
0.1V/20 μ sec. cm

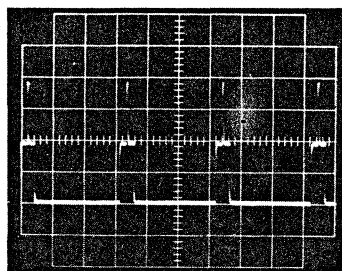


PROCESS WAVEFORMS

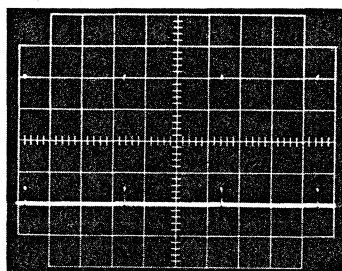
7-A IC1101-9
50 mV/20 μ sec. cm



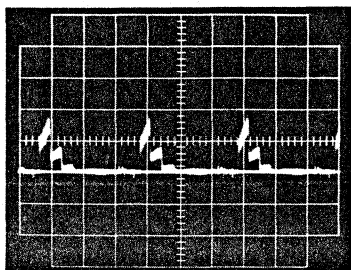
8-A IC1101-12
1V/20 μ sec. cm



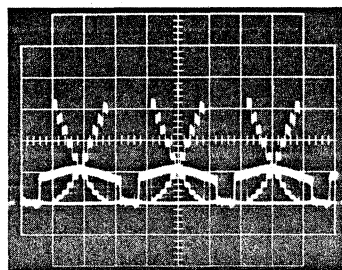
9-A IC1101-13
1V/20 μ sec. cm



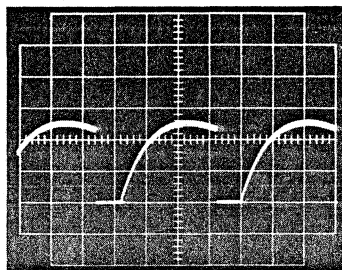
7-B 1101-9 (Colour bar)
50 mV/20 μ sec. cm



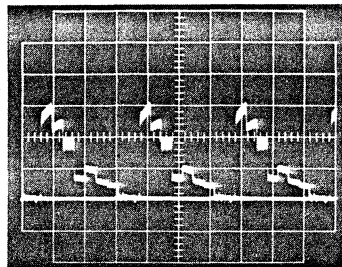
11-A IC1101-16
0.1V/20 μ sec. cm



12-A IC1101-18
1V/5 msec. cm

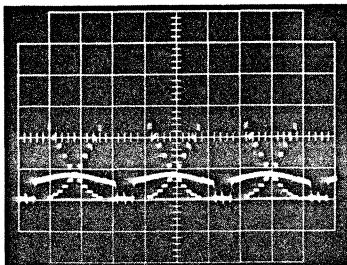


11-B IC1101-16 (Colour bar)
0.1V/20 μ sec. cm

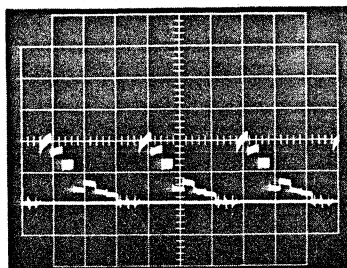


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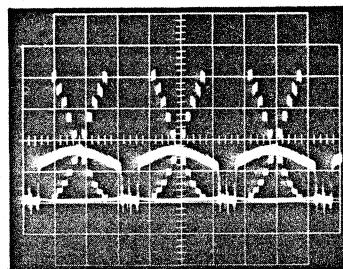
13-A IC1101-20
0.2V/20 μ sec. cm



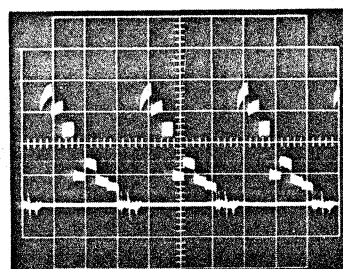
13-B IC1101-20 (Colour bar)
0.2V/20 μ sec. cm



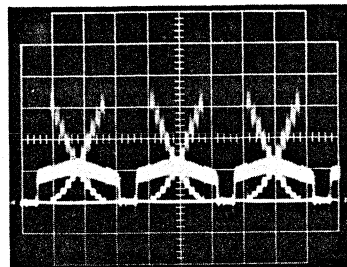
15-A IC1101-26
50 mV/20 μ sec. cm



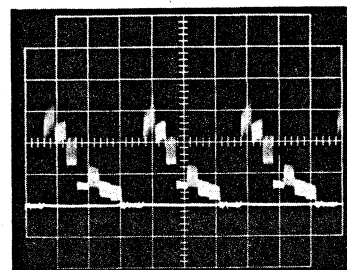
15-B IC1101-26 (Colour bar)
50 mV/20 μ sec. cm



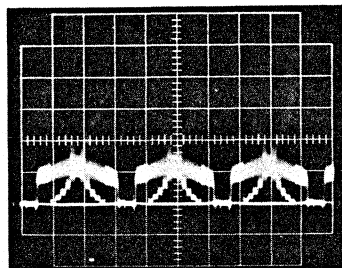
16-A IC1101-27
0.1V/20 μ sec. cm



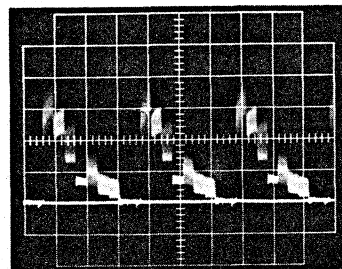
16-B IC1101-27 (Colour bar)
0.1V/20 μ sec. cm



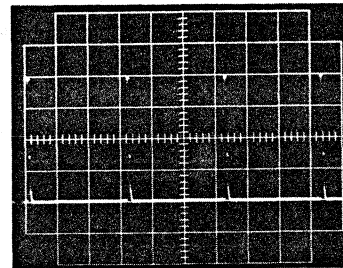
17-A IC1101-28
0.1V/20 μ sec. cm



17-B IC1101-28 (Colour bar)
0.1V/20 μ sec. cm

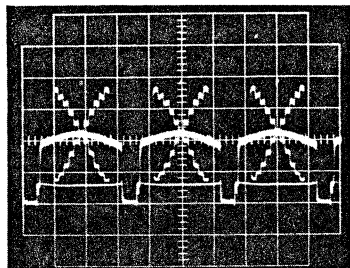


18-A IC1102-6
1V/20 μ sec. cm

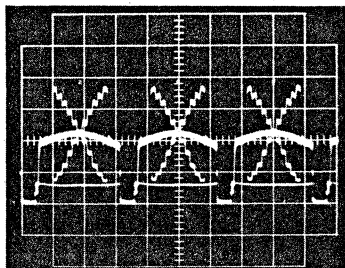


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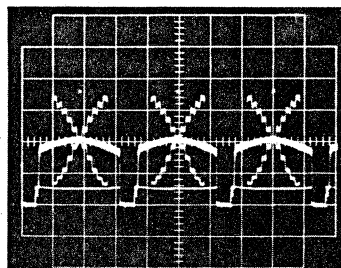
19-A IC1102-11
0.2V/20 μ sec. cm



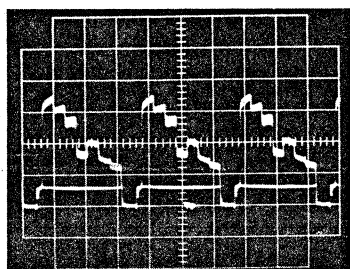
20-A IC1102-12
0.2V/20 μ sec. cm



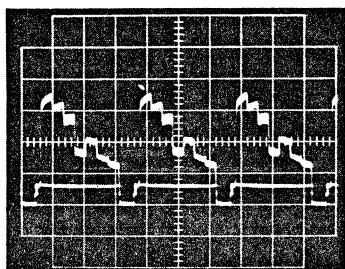
21-A IC1102-13
0.2V/20 μ sec. cm



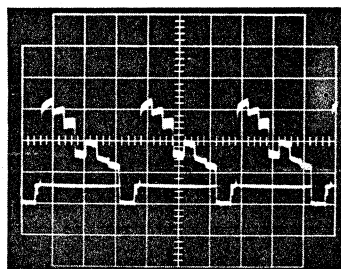
19-B IC1102-11 (Colour bar)
0.2V/20 μ sec. cm



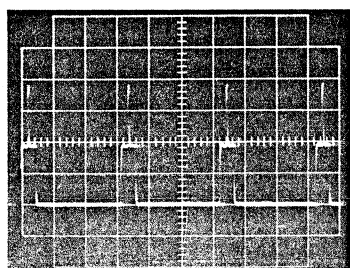
20-B IC1102-12 (Colour bar)
0.2V/20 μ sec. cm



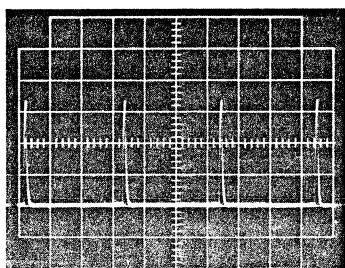
21-B IC1102-13 (Colour bar)
0.2V/20 μ sec. cm



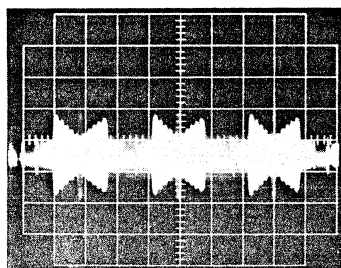
22-A IC1102-15
1V/20 μ sec. cm



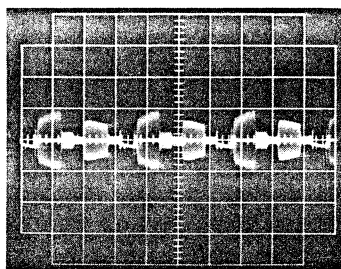
23-A IC1102-16
1V/20 μ sec. cm



24-A IC1104-4
0.1V/20 μ sec. cm

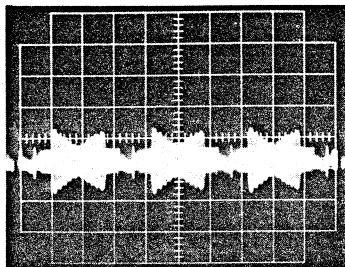


24-B IC1104-4 (Colour bar)
0.1V/20 μ sec. cm

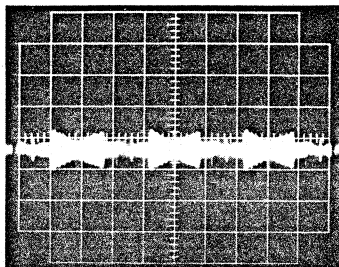


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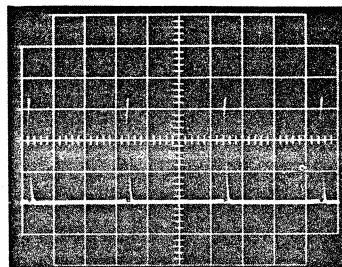
25-A IC1104-6
50 mV/20 μ sec. cm



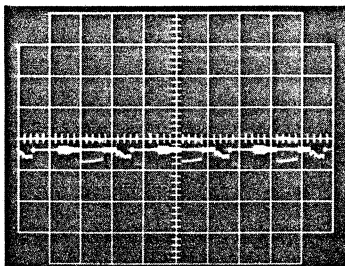
26-A IC1104-14
50 mV/20 μ sec. cm



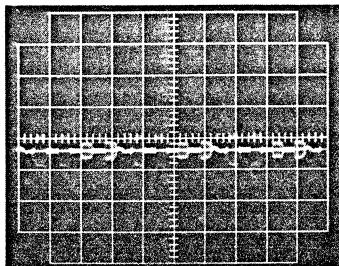
27-A IC1104-15
1V/20 μ sec. cm



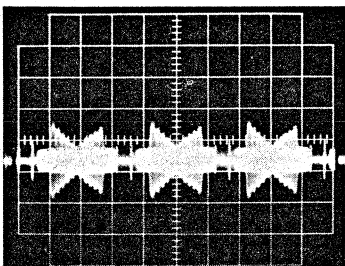
25-B IC1104-6 (Colour bar)
50 mV/20 μ sec. cm



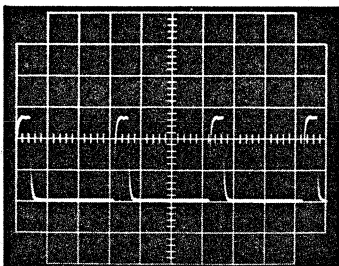
26-B IC1104-14 (Colour bar)
50 mV/20 μ sec. cm



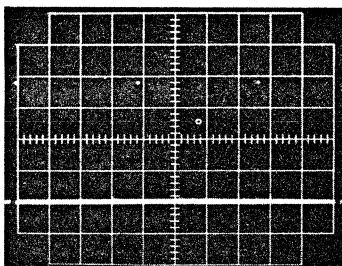
28-A IC1104-16
0.2V/20 μ sec. cm



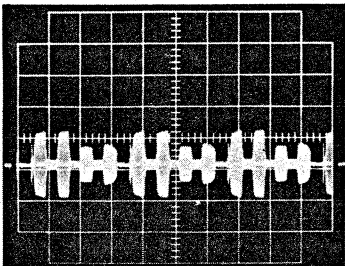
29-A IC1104-17
1V/20 μ sec. cm



30-A IC1104-22
0.5V/5 msec. cm

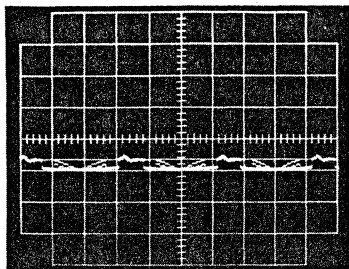


28-B IC1104-16 (Colour bar)
0.2V/20 μ sec. cm

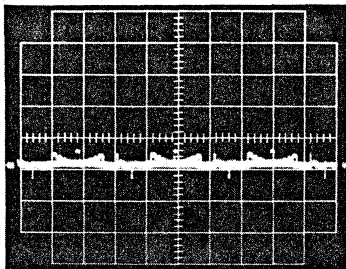


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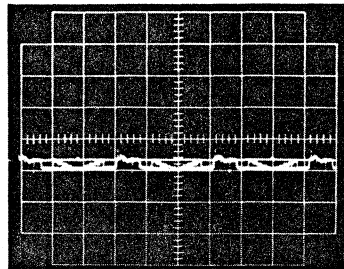
31-A IC1104-26
50 mV/20 μ sec. cm



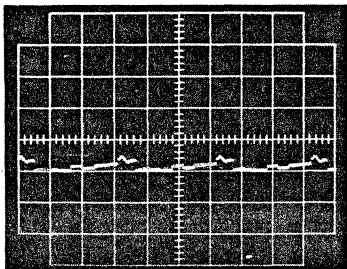
32-A IC1104-24
50 mV/20 μ sec. cm



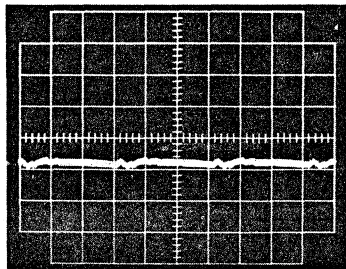
33-A IC1104-26
50 mV/20 μ sec. cm



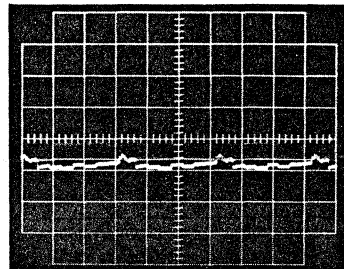
31-B IC1104-23 (Colour bar)
50 mV/20 μ sec. cm



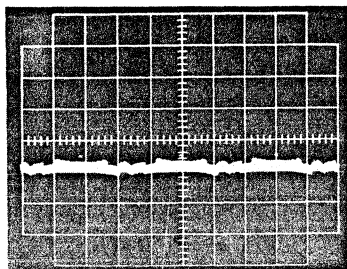
32-B IC1104-24 (Colour bar)
50 mV/20 μ sec. cm



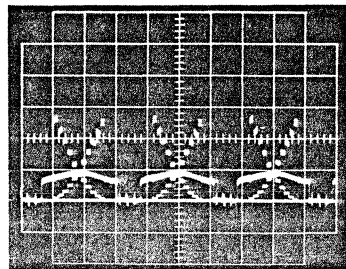
33-B IC1104-26 (Colour bar)
50 mV/20 μ sec. cm



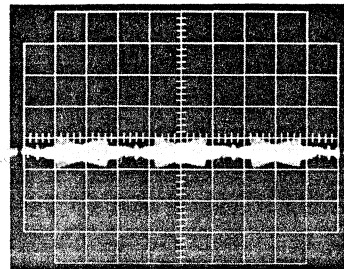
34-A IC1104-27
50 mV/20 μ sec. cm



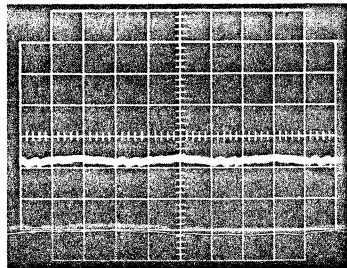
35-A IC1104-31
0.2V/20 μ sec. cm



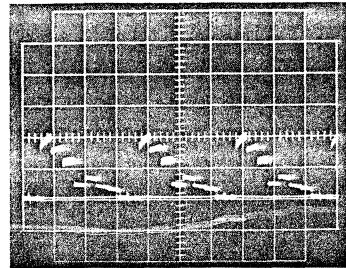
36-A IC1104-34
50 mV/20 μ sec. cm



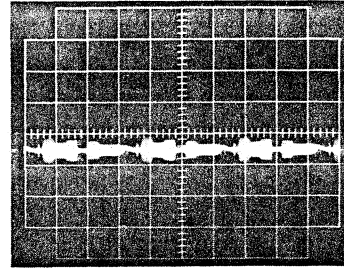
34-B IC1104-27 (Colour bar)
50 mV/20 μ sec. cm



35-B IC1104-31 (Colour bar)
0.2V/20 μ sec. cm

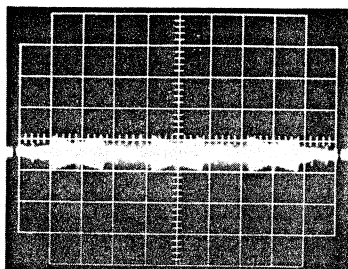


36-B IC1104-34 (Colour bar)
50 mV/20 μ sec. cm

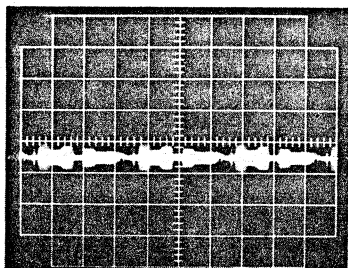


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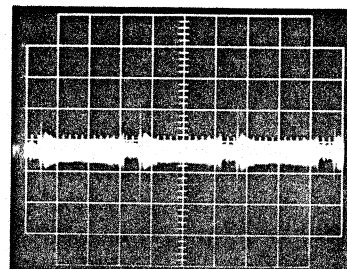
37-A IC1104-37
50 mV/20 μ sec. cm



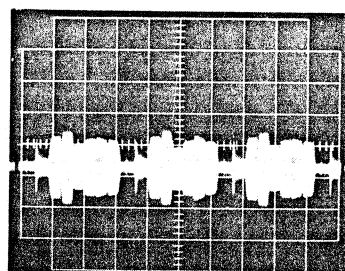
37-B IC1104-37 (Colour bar)
50 mV/20 μ sec. cm



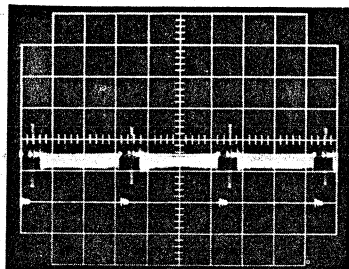
39-A IC1105-4
0.1V/20 μ sec. cm



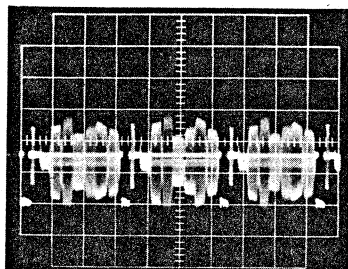
39-B IC1105-4 (Colour bar)
0.2V/20 μ sec. cm



40-A IC1105-5
0.1V/20 μ sec. cm

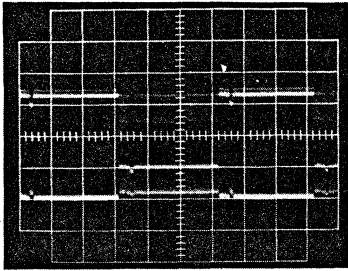


40-B IC1105-5 (Colour bar)
0.1V/20 μ sec. cm

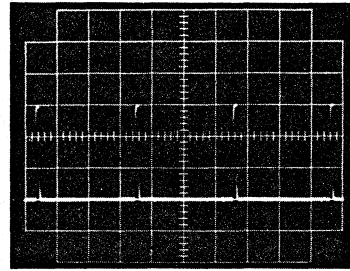


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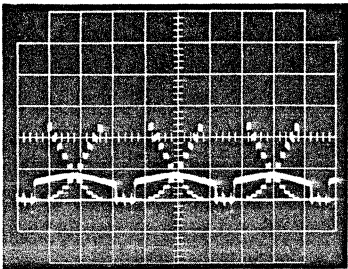
43-A IC1105-8
0.2V/20 μ sec. cm



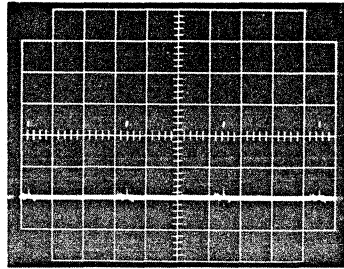
45-A IC1105-11
1V/20 μ sec. cm



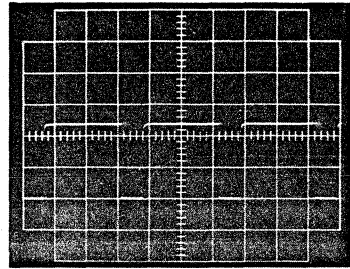
46-A IC1105-12
0.2V/20 μ sec. cm



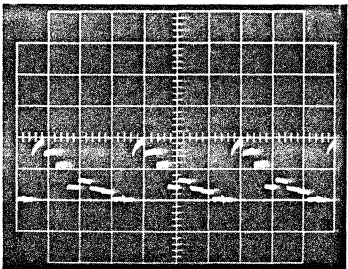
47-A IC1105-18
0.2V/20 μ sec. cm



48-A IC1105-20
2V/20 μ sec. cm

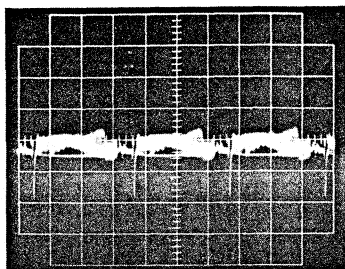


46-B IC1105-12 (Colour bar)
0.2V/20 μ sec. cm

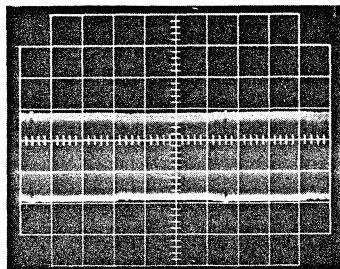


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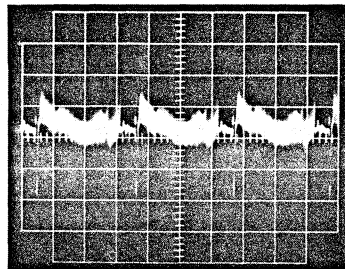
49-A IC1105-21
50 mV/20 μ sec. cm



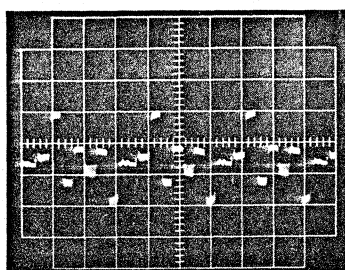
50-A IC1105-23
0.2V/20 μ sec. cm



51-A IC1105-24
50 mV/20 μ sec. cm

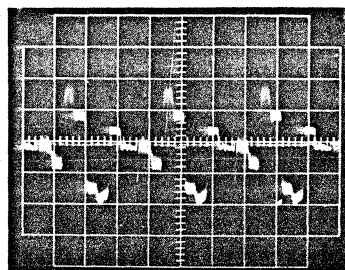


49-B IC1105-21 (Colour bar)
0.1V/20 μ sec. cm

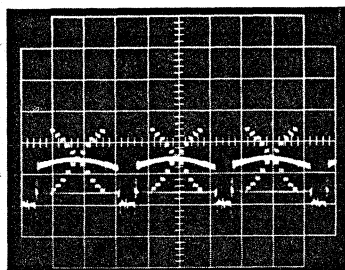


50-A

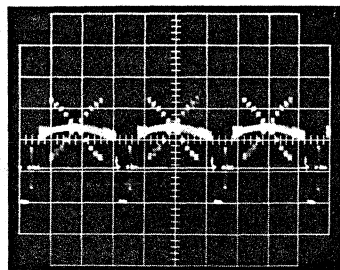
51-B IC1105-24 (Colour bar)
0.1V/20 μ sec. cm



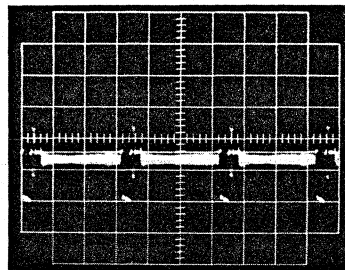
52-A IC1105-25
0.2V/20 μ sec. cm



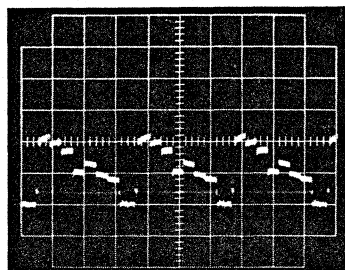
53-A IC1105-27
0.5V/20 μ sec. cm



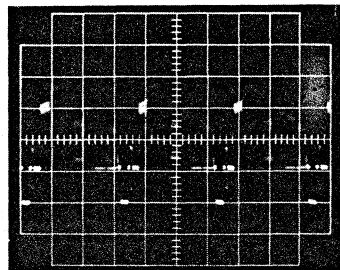
54-A IC1105-28
0.1V/20 μ sec. cm



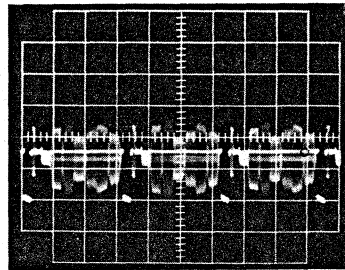
52-B IC1105-25 (Colour bar)
0.2V/20 μ sec. cm



53-B IC1105-27 (Colour bar)
0.5V/20 μ sec. cm

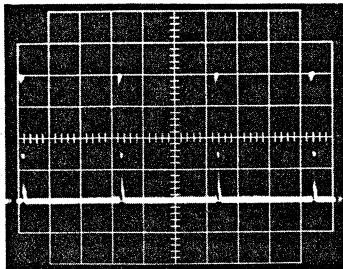


54-B IC1105-28 (Colour bar)
0.1V/20 μ sec. cm

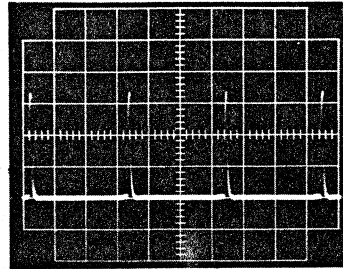


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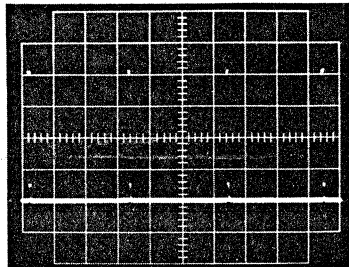
56-A IC1106-2
1V/20 μ sec. cm



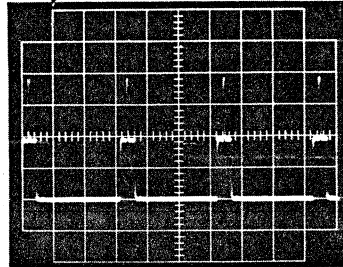
57-A IC1106-3
1V/20 sec. cm



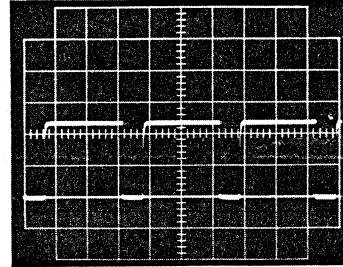
58-A IC1106-6
1V/20 sec. cm



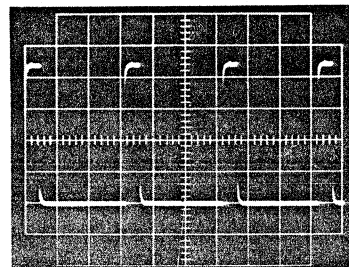
59-A IC1106-7
1V/20 sec. cm



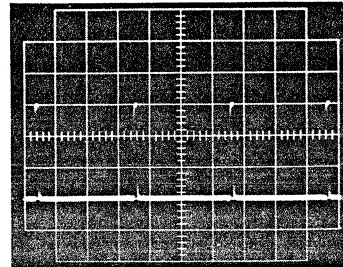
60-A IC1106-8
2V/20 μ sec. cm



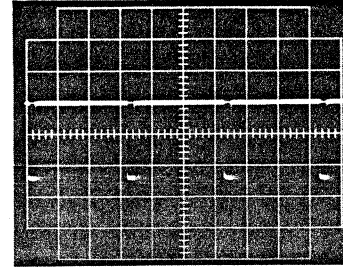
61-A IC1106-11
1V/20 μ sec. cm



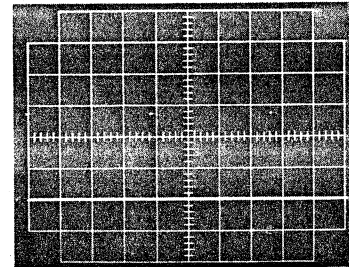
62-A IC1106-12
1V/20 μ sec. cm



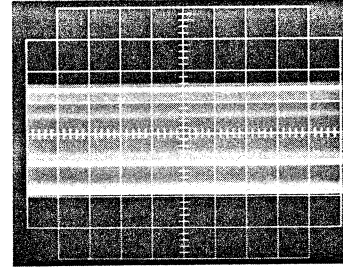
63-A IC1106-13
2V/20 μ sec. cm



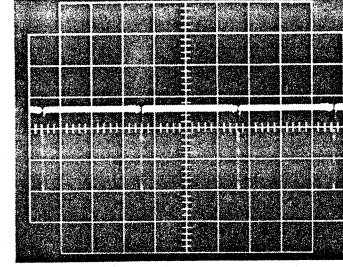
64-A IC1106-14
2V/5 msec. cm



65-A IC1106-17
0.2V/20 μ sec. cm

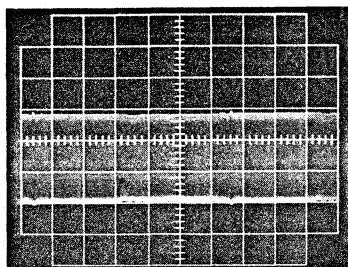


66-A IC1106-18
0.5V/20 μ sec. cm

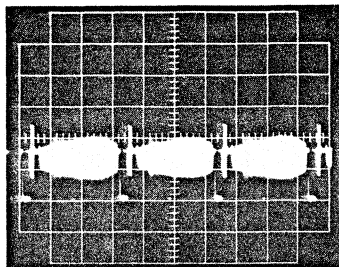


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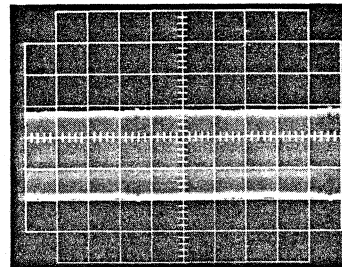
67-A IC1106-19
0.2V/20 μ sec. cm



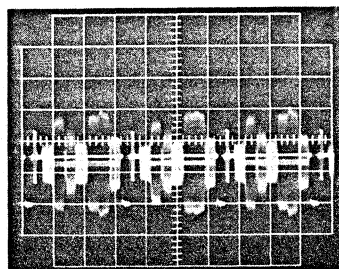
68-A IC1107-7
0.1V/20 μ sec. cm



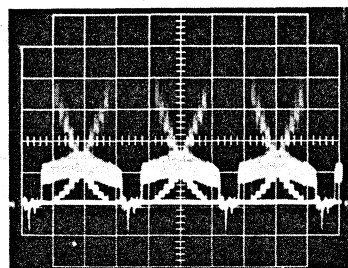
69-A IC1109-10
0.2V/20 μ sec. cm



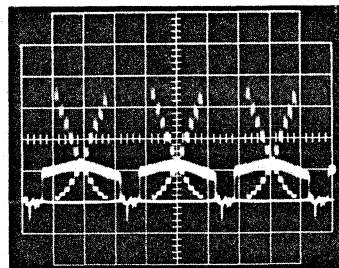
48-B IC1107-7 (Colour bar)
0.1V/20 μ sec. cm



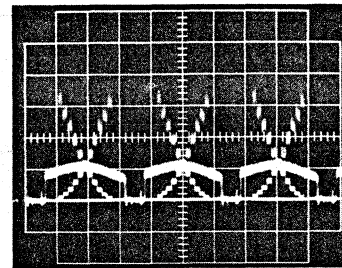
70-A TP1101
0.1V/20 μ sec. cm



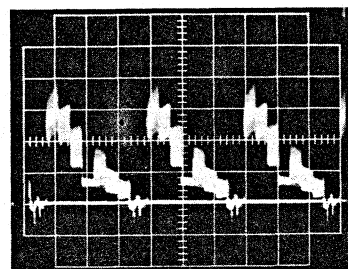
71-A TP1102
0.1V/20 μ sec. cm



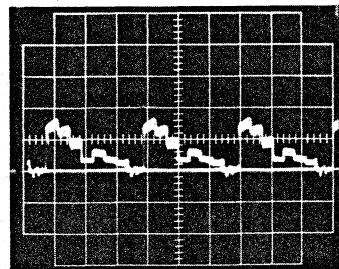
72-A TP1103
0.1V/20 μ sec. cm



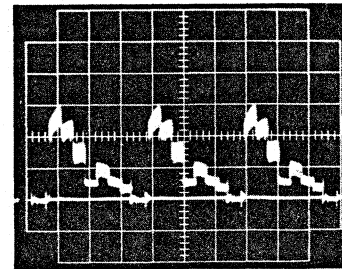
70-B TP1101 (Colour bar)
0.1V/20 μ sec. cm



71-B TP1102 (Colour bar)
0.1V/20 μ sec. cm

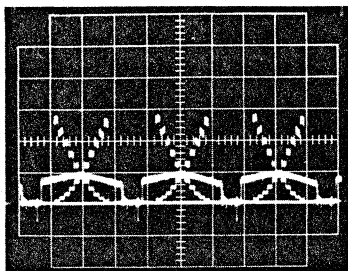


72-B TP1103 (Colour bar)
0.1V/20 μ sec. cm

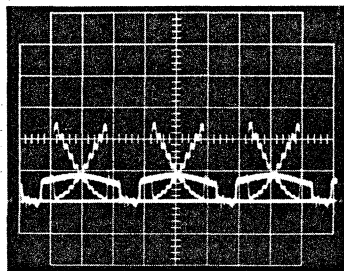


PROCESS WAVEFORMS

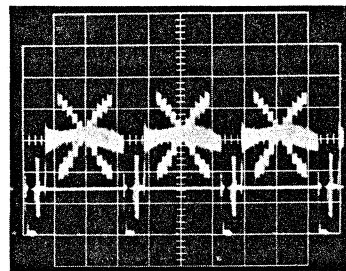
73-A TP1104
50 mV/20 μ sec. cm



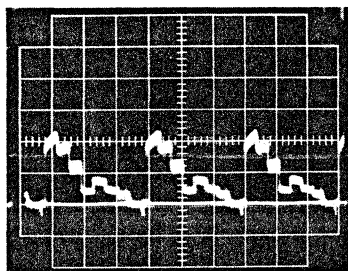
74-A TP1105
50 mV/20 μ sec. cm



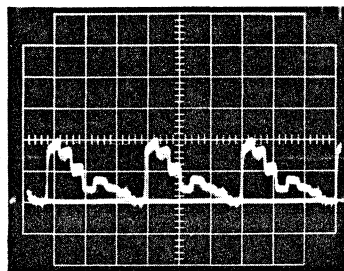
75-A TP1107
0.2V/20 μ sec. cm



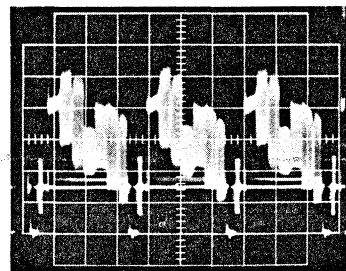
73-B TP1104 (Colour bar)
50 mV/20 μ sec. cm



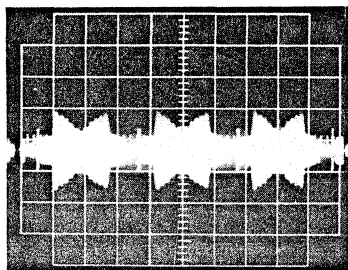
74-B TP1105 (Colour bar)
50 mV/20 μ sec. cm



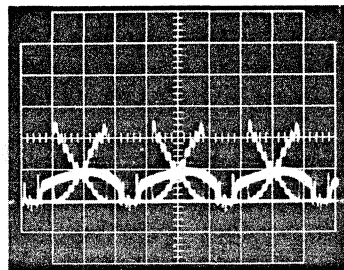
75-B TP1107 (Colour bar)
0.2V/20 μ sec. cm



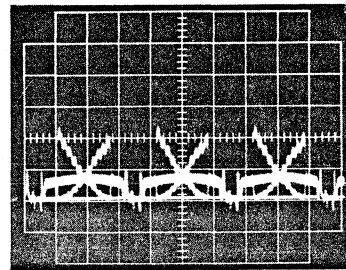
76-A TP1108
0.2V/20 μ sec. cm



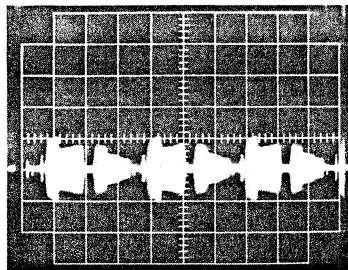
77-A TP1109
50 mV/20 μ sec. cm



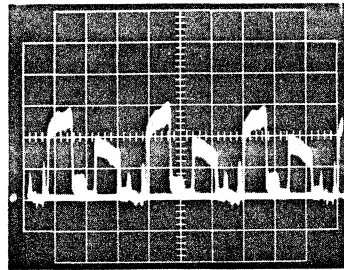
78-A TP110
50 mV/20 μ sec. cm



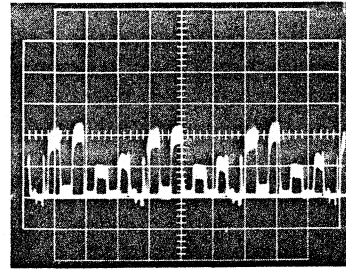
76-B TP1108 (Colour bar)
0.2V/20 μ sec. cm



77-B TP1109 (Colour bar)
50 mV/20 μ sec. cm

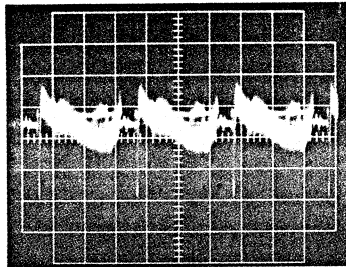


78-B TP110 (Colour bar)
50 mV/20 μ sec. cm

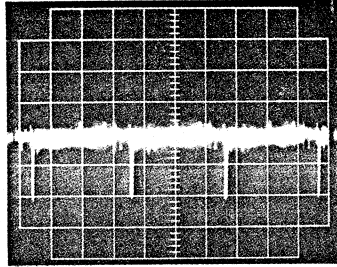


PROCESS WAVEFORMS

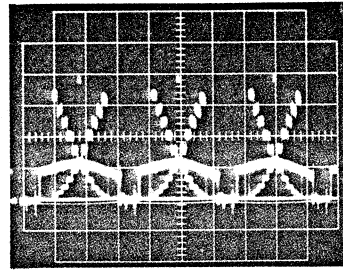
79-A TP1113
50 mV/20 μ sec. cm



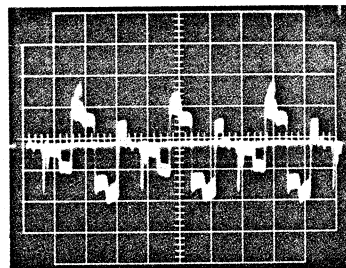
80-A TP1114
50 mV/20 μ sec. cm



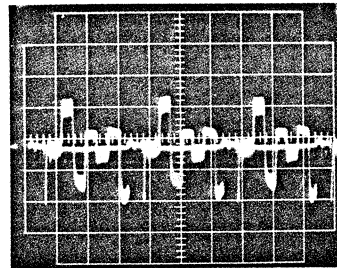
81-A TP116
0.1V/20 μ sec. cm



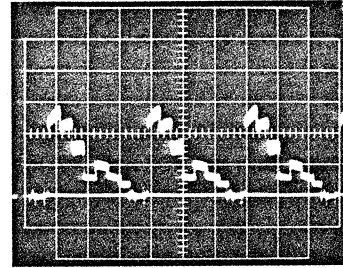
79-B TP1113 (Colour bar)
0.1V/20 μ sec. cm



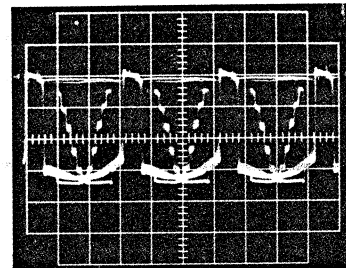
80-B TP1114 (Colour bar)
0.1V/20 μ sec. cm



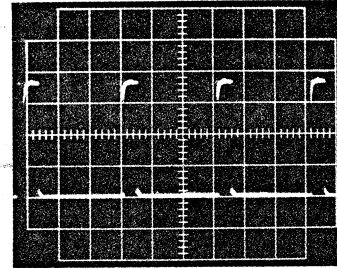
81-B TP1116 (Colour bar)
0.1V/20 μ sec. cm



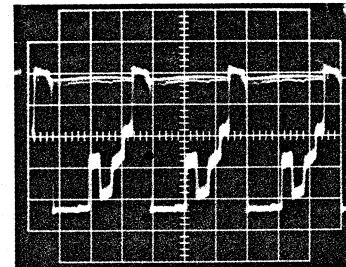
82-A TP1117
0.2V/20 μ sec. cm



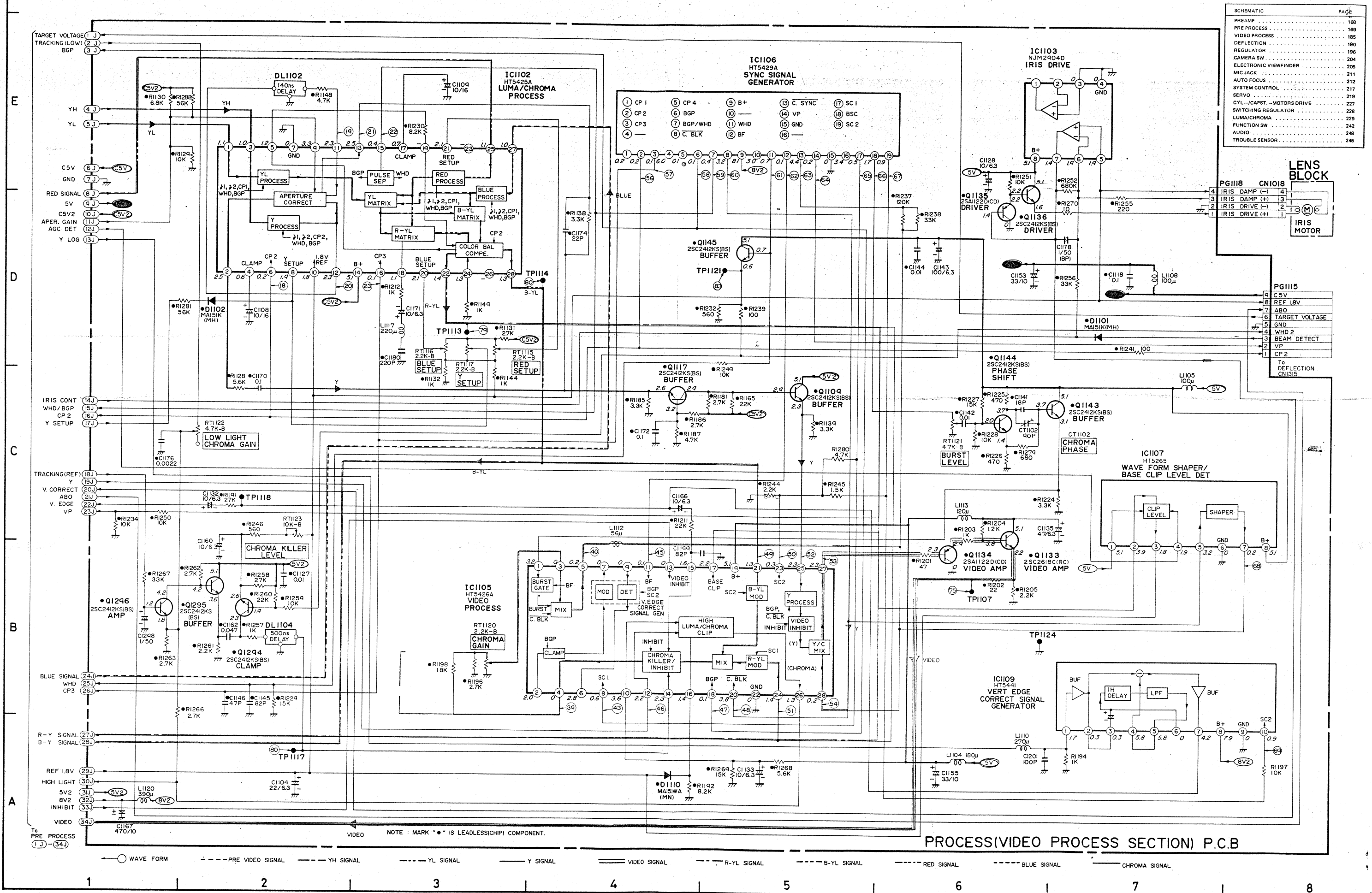
83-A TP1121
1V/20 μ sec. cm



82-B TP1117 (Colour bar)
0.2V/20 μ sec. cm



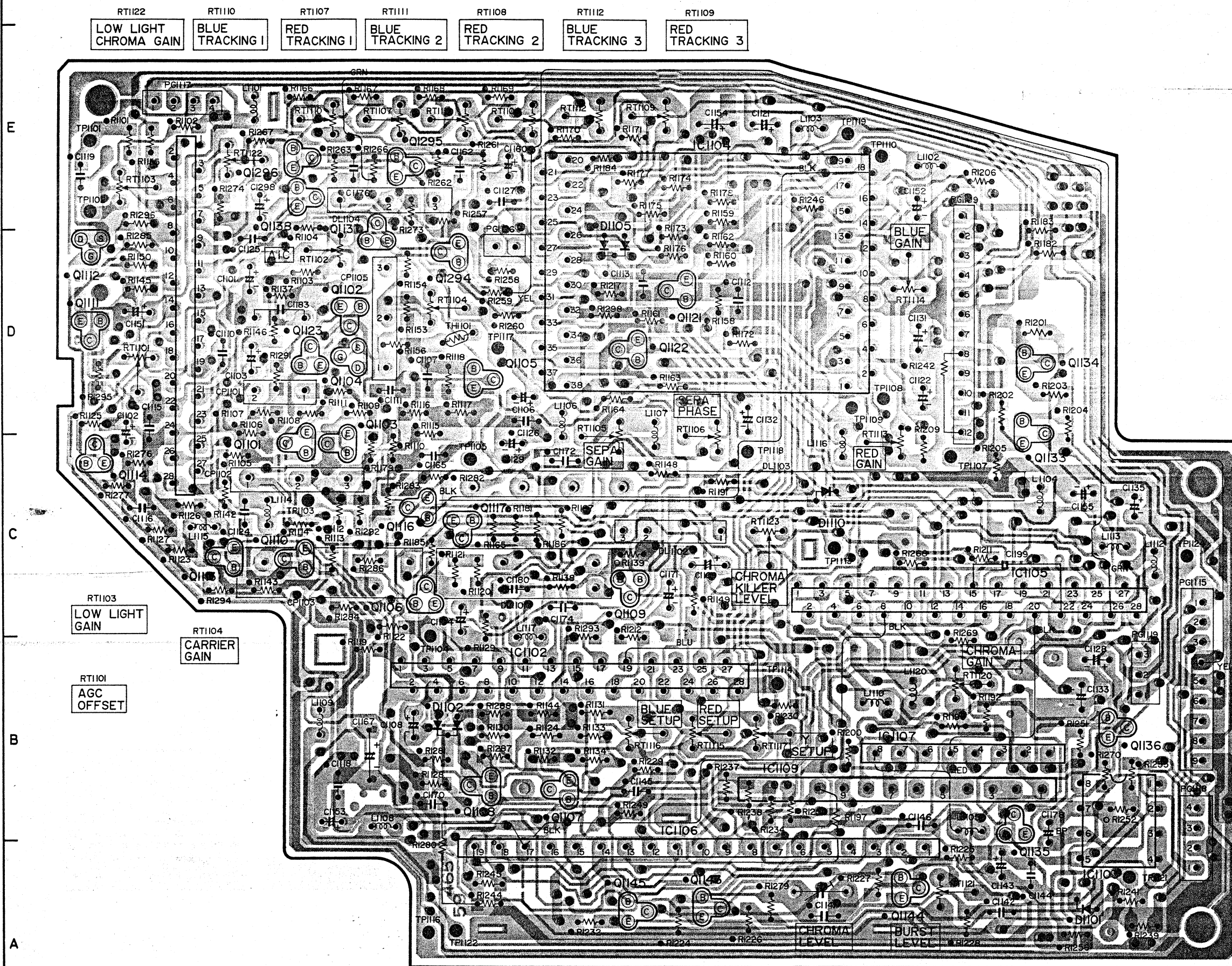
PROCESS (VIDEO PROCESS) SCHEMATIC DIAGRAM



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PROCESS(VIDEO PROCESS SECTION) P.C.B

PROCESS CIRCUIT BOARD



NOTE : MARK "•" IS LEADLESS(CHIP) COMPONENT.

PROCESS P.C.B

PG1109

1	AUTO WHITE BAL SW
2	COLOR SHADE RED
3	COLOR SHADE BLUE
4	WINDOW WEIGHT
5	DARK SHADE HORIZ.
6	DARK SHADE VERT.
7	C. STBY 8V
8	INHIBIT
9	GND
10	VIDEO
11	WHT BAL RESET
12	C. STBY 5V

To
REGULATOR
CN1509

PG1115

1	CP 2
2	VP
3	BEAM DETECT
4	WHD 2
5	GND
6	TARGET VOLTAGE
7	ABO
8	REF 1.8V
9	C5V

To
DEFLECTION
CN1315

PG1117

1	TARGET VOLTAGE
2	C. STBY 8V
3	PRE VIDEO
4	GND

To
PRE AMP
CN1017

PG1118

4	IRIS DAMP (-)
3	IRIS DAMP (+)
2	IRIS DRIVE (-)
1	IRIS DRIVE (+)

To
LENS
BLOCK
(IRIS MOTOR)
CN1018

PG1119

1	GAIN UP
2	GND
3	IRIS CONT

To
CAMERA
SWITCH
CN1619

IC1101

1	—	15
2	1.9	16
3	1.2	17
4	1.4	18
5	1.8	19
6	0	20
7	2.0	21
8	1.9	22
9	1.9	23
10	—	24
11	8.1	25
12	0.4	26
13	0.1	27
14	1.9	28

Q1108

B	2.7
C	3.3
E	3.3

Q1105

B	0.5
C	0
E	1.1

Q1113

B	2.0
C	5.1
E	1.3

Q1134

B	2.3
C	0
E	2.9

Q1294

B	1.9
C	2.3
E	2.6

Q1103

B	1.6
C	5.1
E	1.0

- Through hole
- Soldered Side
- Parts Side

IC1101

1	—	15	3.3
2	1.9	16	2.1
3	1.2	17	—
4	1.4	18	2.3
5	1.8	19	1.8
6	0	20	2.2
7	2.0	21	2.8
8	1.9	22	0
9	1.9	23	1.3
10	—	24	5.1
11	8.1	25	—
12	0.4	26	2.1
13	0.1	27	2.2
14	1.9	28	2.0

IC1102

1	1.1	15	0.4
2	2.5	16	0.1
3	1.0	17	0.7
4	0.6	18	1.1
5	1.2	19	—
6	0.2	20	2.1
7	0	21	2.1
8	1.9	22	1.4
9	3.3	23	—
10	1.8	24	1.3
11	2.3	25	1.1
12	2.3	26	—
13	2.5	27	1.0
14	5.1	28	1.3

IC1103

1	—
2	—
3	0
4	0
5	1.9
6	1.9
7	1.4
8	5.1

IC1104

1	1.1	20	0
2	2.3	21	0.1
3	1.9	22	1.9
4	2.8	23	1.9
5	1.3	24	1.9
6	1.1	25	1.9
7	—	26	1.9
8	—	27	5.1
9	0	28	1.3
10	0	29	—
11	1.4	30	2.2
12	1.8	31	2.0
13	0.3	32	1.8
14	0.4	33	1.9
15	0.1	34	1.9
16	2.9	35	5.0
17	0.4	36	1.9
18	1.0	37	3.1
19	1.9	38	—

IC1105

1	3.2	15	1.6
2	2.0	16	1.4
3	0	17	2.2
4	0	18	0.1
5	0.2	19	5.1
6	2.8	20	3.8
7	0	21	1.3
8	0.6	22	0
9	0	23	0.3
10	3.6	24	1.4
11	0.1	25	2.3
12	2.2	26	1.3
13	0	27	2.3
14	2.3	28	0.2

IC1106

1	0.2
2	0.2
3	0.1
4	6.0
5	0.1
6	0.1
7	0.4
8	3.2
9	8.1
10	3.0
11	0.7
12	0.1
13	4.4
14	0.2
15	0
16	3.4
17	0.5
18	1.7
19	0.9

Q1108

B	2.7
C	3.3
E	3.3

Q1107

B	3.2
C	2.9
E	2.6

Q1136

B	2.2
C	5.1
E	1.6

Q1101

B	2.2
C	4.5
E	1.6

Q1105

B	0.5
C	0
E	1.1

Q1106

B	0.4
C	0
E	1.0

Q1107

B	3.3
C	0
E	3.3

Q1109

B	2.9
C	5.1
E	2.3

IC1107

1	5.1
2	3.9
3	1.8
4	1.9
5	3.2
6	0
7	0.2
8	5.1

IC1109

1	1.7
2	0.3
3	0.3
4	5.8
5	5.8
6	0
7	4.2
8	7.9
9	0
10	0.9

Q1113

B	2.0
C	5.1
E	1.3

Q1114

B	1.4
C	0
E	2.1

Q1116

B	1.1
C	2.9
E	0.5

Q1121

B	1.9
C	4.9
E	1.2

Q1110

B	2.0
C	0
E	2.7

Q1111

B	1.2
C	0
E	1.8

Q1112

G	0.2
D	1.9
S	2.1

Q1134

B	2.3
C	0
E	2.9

Q1135

B	1.4
C	0
E	2.2

Q1137

B	0.6
C	0
E	1.3

Q1138

B	3.9
C	0
E	2.3

Q1122

B	3.7
C	5.1
E	3.1

Q1123

B	1.7
C	0
E	2.3

Q1133

B	3.8
C	5.1
E	2.2

Q1294

B	1.9
C	2.3
E	2.6

Q1295

B	4.2
C	5.1
E	3.6

Q1296

B	1.2
C	4.2
E	1.8

Q1102

B	4.5
C	1.7
E	5.1

Q1143

B	3.7
C	5.1
E	3.1

Q1144

B	2.0
C	3.7
E	1.4

Q1145

B	0.7
C	5.1
E	0.6

Q1103

B	1.6
C	5.1
E	1.0

Q1104

G	2.2
D	1.6
S	1.7

DEFLECTION SCHEMATIC DIAGRAM

E

D

C

B

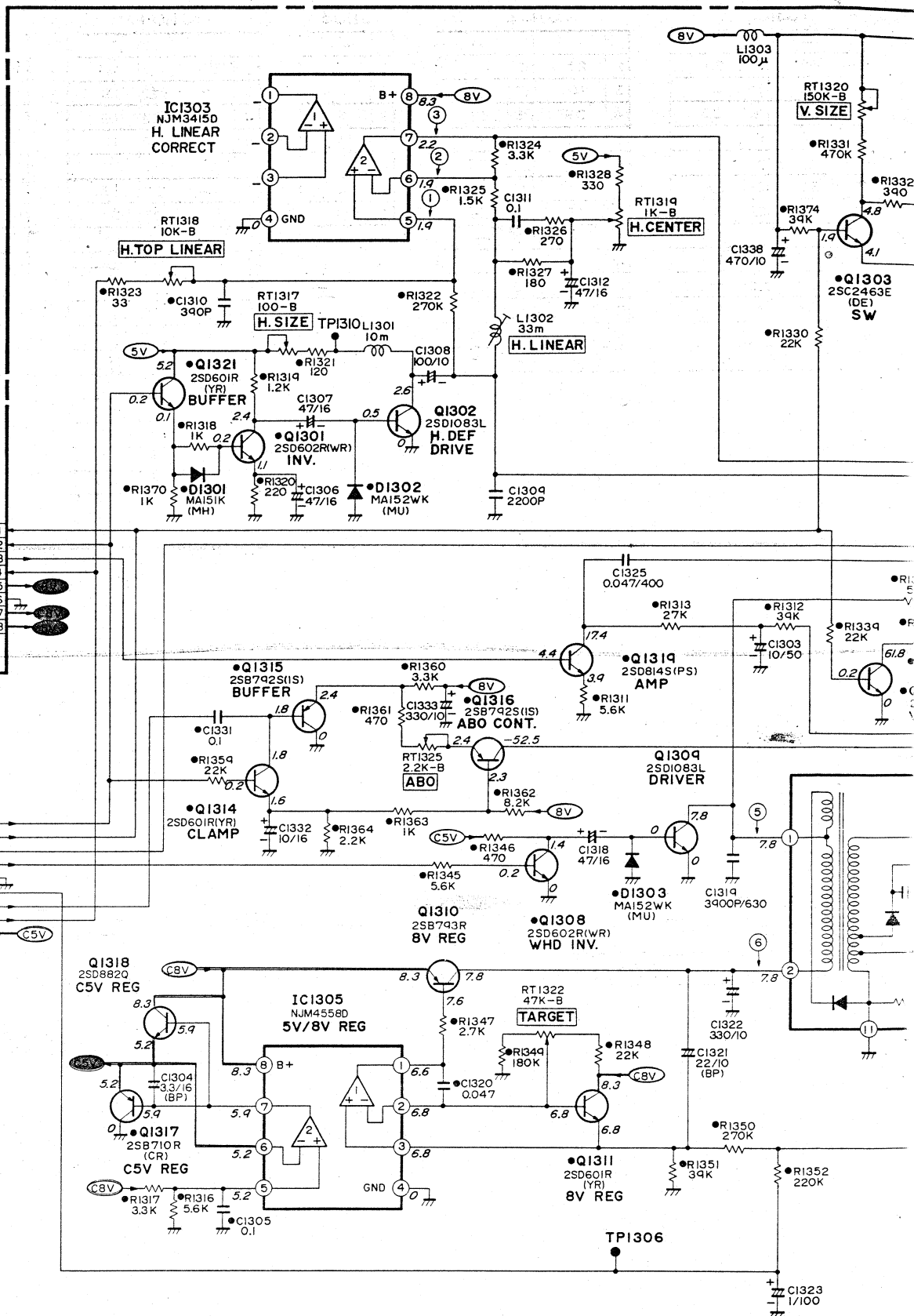
A

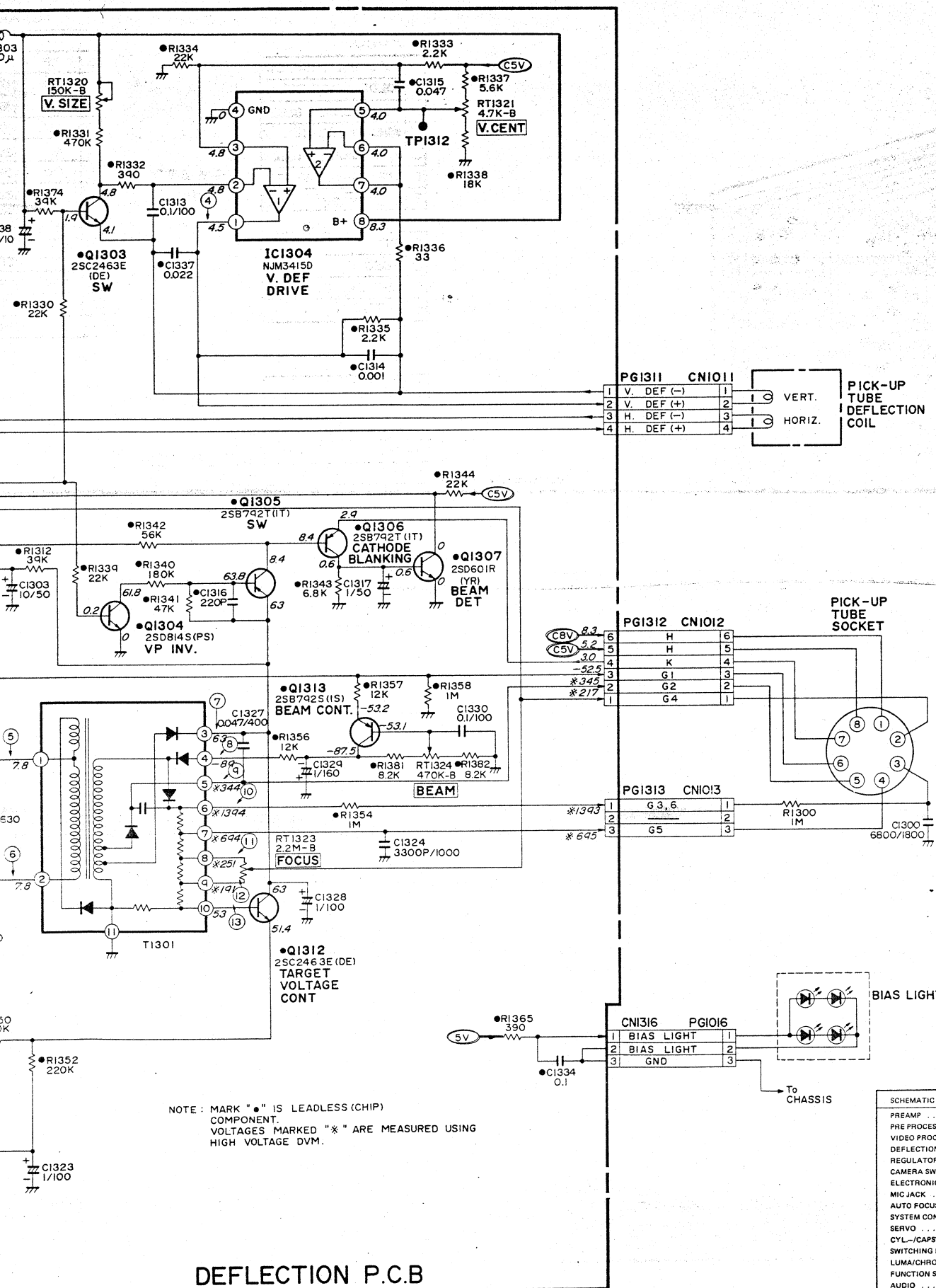
○ : WAVE FORM

CN1310	
VP	1
CP 2	2
DYNAMIC FOCUS	3
REF 1.8V	4
C STBY 8V	5
GND	6
C8V	7
C STBY 5V	8

To PROCESS
(VIDEO PROCESS)
PG1115

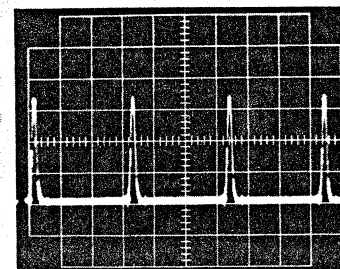
CN1315	
CP 2	1
VP	2
BEAM DETECT	3
WHD 2	4
GND	5
TARGET VOLTAGE	6
ABO	7
REF 1.8V	8
C5V	9



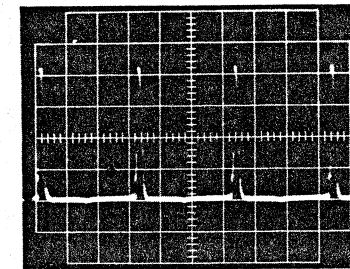


DEFLECTION WAVEFORMS

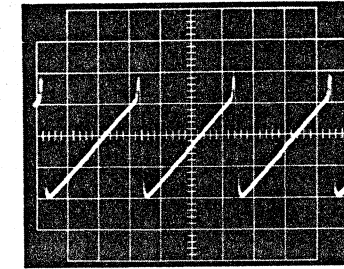
1-A IC1303-5
0.1V/20μsec.cm



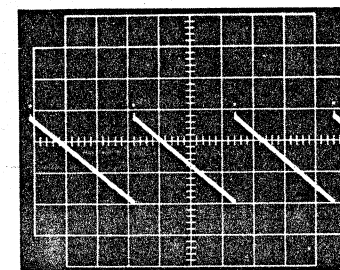
2-A IC1303-6
0.1V/20μsec.cm



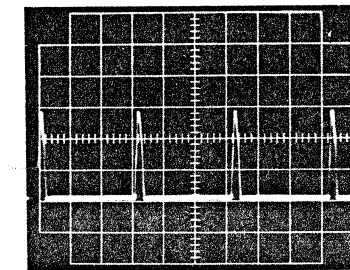
3-A IC1303-7
0.5V/20μsec.cm



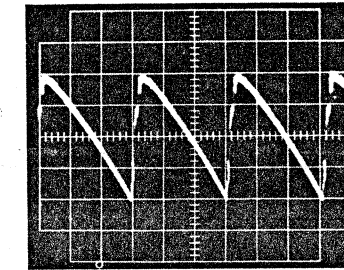
4-A IC1304-1
2V/5msec.cm



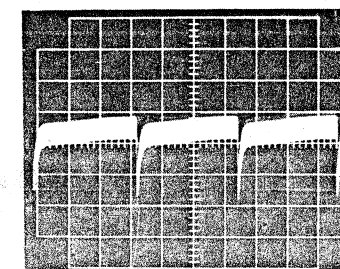
5-A T1301-1
50V/20μsec.cm



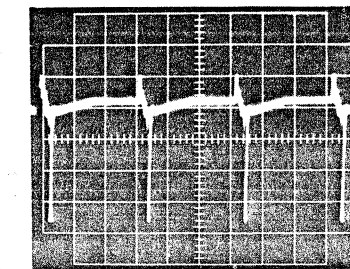
6-A T1301-2
50mV/20μsec.cm



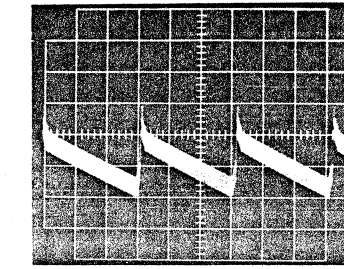
7-A T1301-3
0.1V/5msec.cm



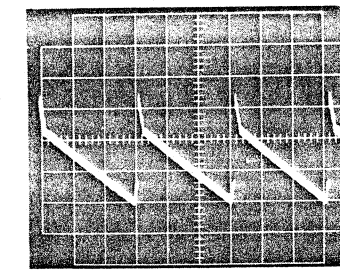
8-A T1301-4
20V/20μsec.cm



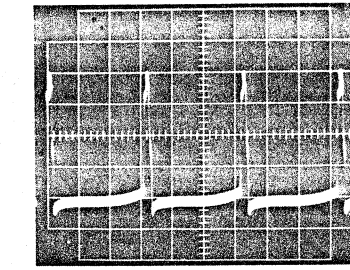
9-A T1301-5
0.2V/20μsec.cm



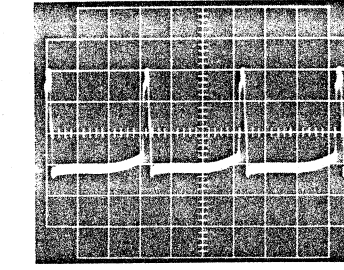
10-A T1301-6
2V/20μsec.cm



11-A T1301-8
2V/20μsec.cm



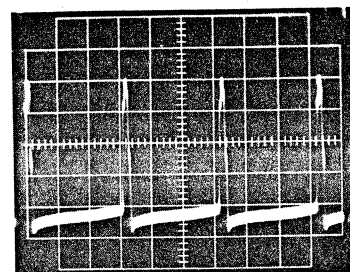
12-A T1301-9
2V/20μsec.cm



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DEFLECTION WAVEFORMS

13-A T1301-10
1V/20 μ sec.cm



DEFLECTION CIRCUIT BOARD

Q1301	
B	0.2
C	2.4
E	1.1

Q1302	
B	0.5
C	2.6
E	0

Q1303	
B	1.9
C	4.8
E	4.1

Q1304	
B	0.2
C	61.8
E	0

Q1308	
B	0.2
C	1.4
E	0

Q1309	
B	0
C	7.8
E	0

Q1310	
B	7.6
C	7.8
E	8.3

Q1311	
B	6.8
C	8.3
E	6.8

Q1315	
B	1.8
C	0
E	2.4

Q1316	
B	2.3
C	-52.5
E	2.4

Q1319	
B	4.4
C	17.4
E	3.9

Q1321	
B	0.2
C	5.2
E	0.1

Q1318	
B	5.9
C	8.3
E	5.2

Q1305	
B	63.8
C	8.4
E	6.3

Q1306	
B	8.4
C	0.6
E	2.9

Q1307	
B	0.6
C	0
E	0

Q1317	
B	5.9
C	0
E	5.2

Q1312	
B	5.3
C	63
E	51.4

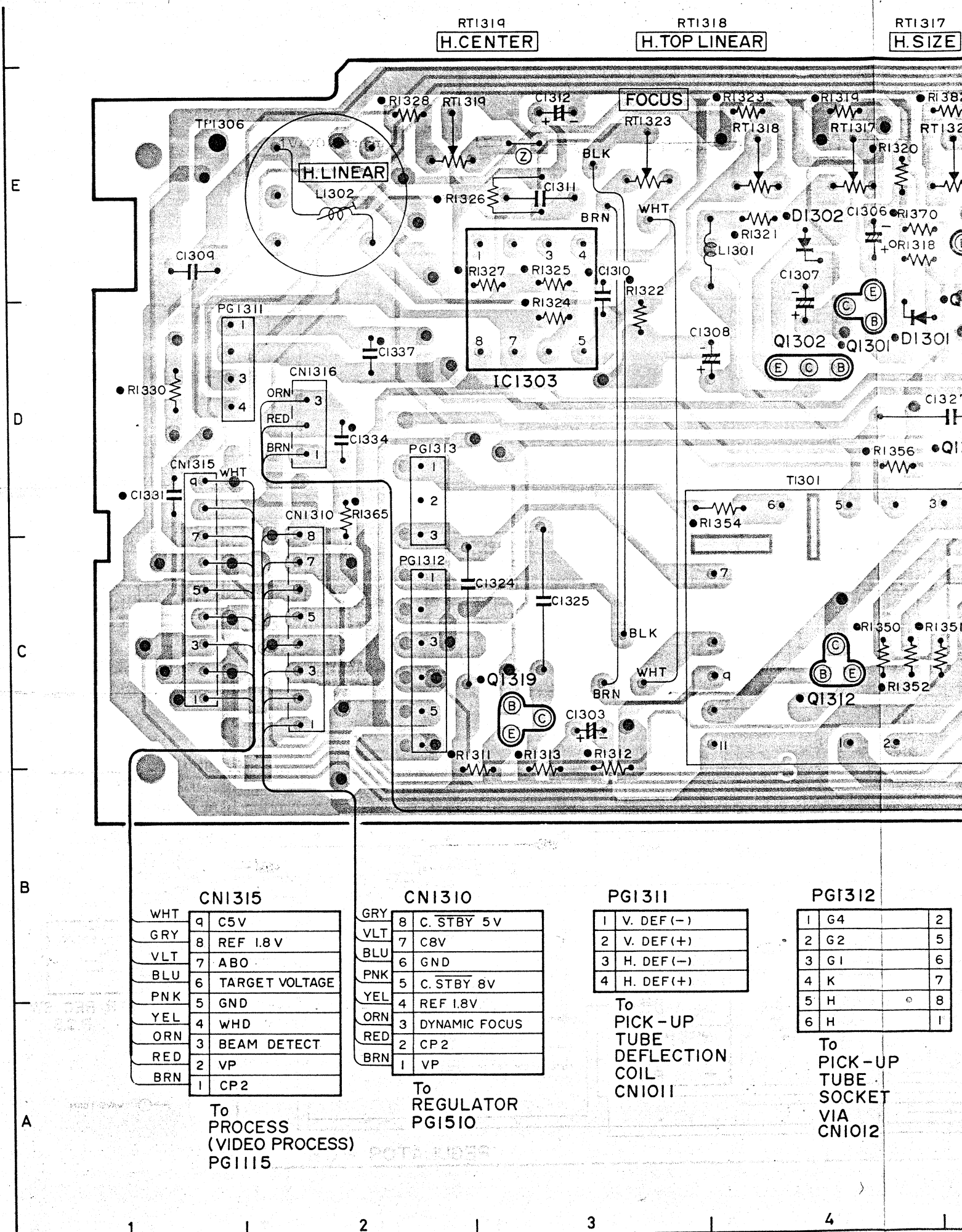
Q1313	
B	-53.1
C	-87.5
E	-53.2

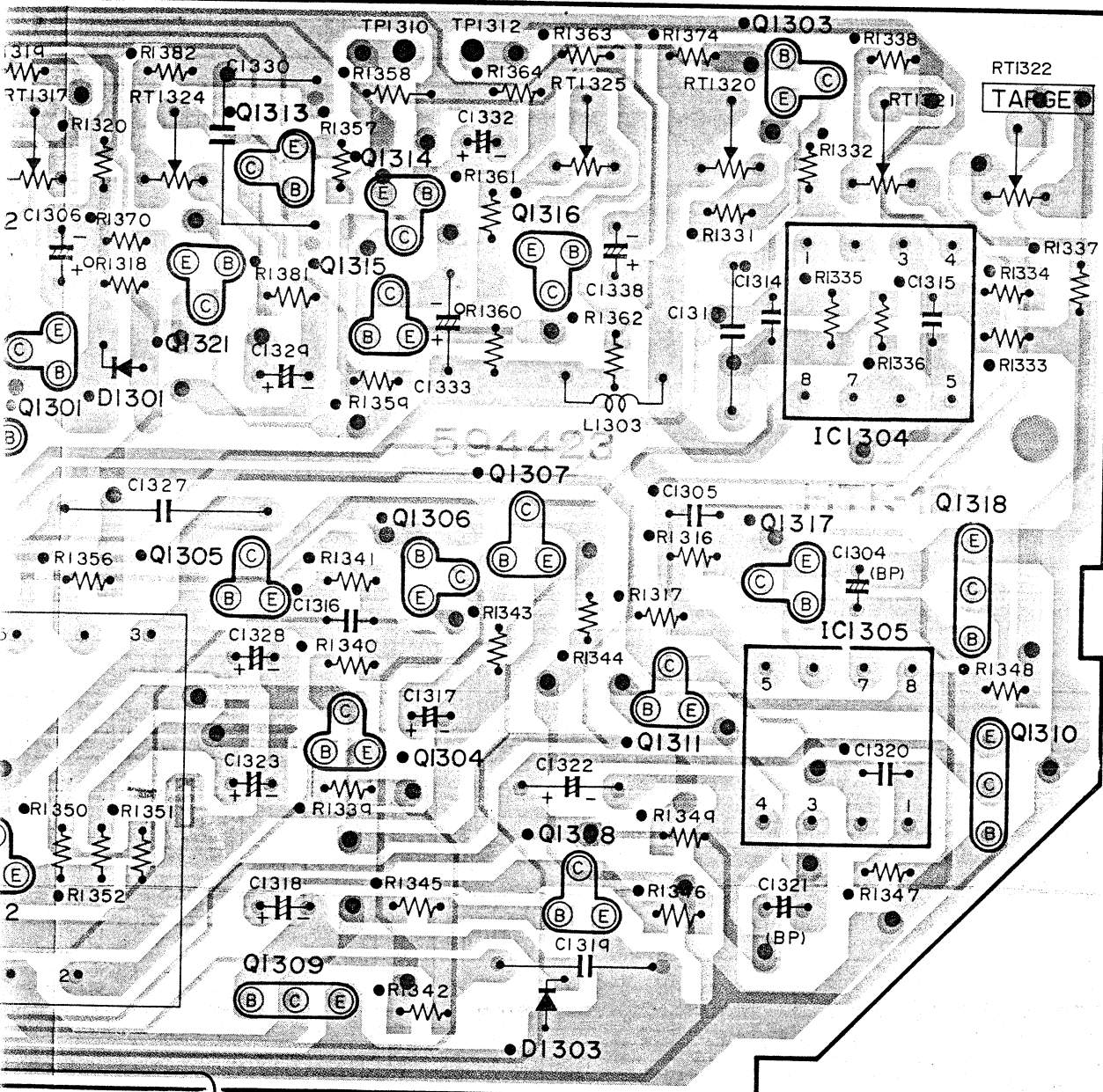
Q1314	
B	0.2
C	1.8
E	1.6

IC1304			
1	2	3	4
4.5	4.8	4.8	0
8	7	6	5
8.3	4.0	4.0	4.0

IC1303			
1	2	3	4
-	-	-	0
8	7	6	5
8.3	2.2	1.9	1.9

IC1305			
5	6	7	8
5.2	5.2	5.9	8.3
4	3	2	1
0	6.8	6.8	6.6



RTI317
H.SIZERTI324
BEAMRTI325
ABORTI320
V.SIZERTI321
V.CENT

DEFLECTION P.C.B

PGI313

1	G3.6	3
2		
3	G5	4

To
PICK-UP
TUBE
SOCKET
VIA
CN1013

CN1316

ORN	3	GND	3
RED	2	BIAS LIGHT	2
BRN	1	BIAS LIGHT	1

To
BIAS LIGHT
PG1016

Q1317

B	5.9
C	0
E	5.2

Q1318

B	5.9
C	8.3
E	5.2

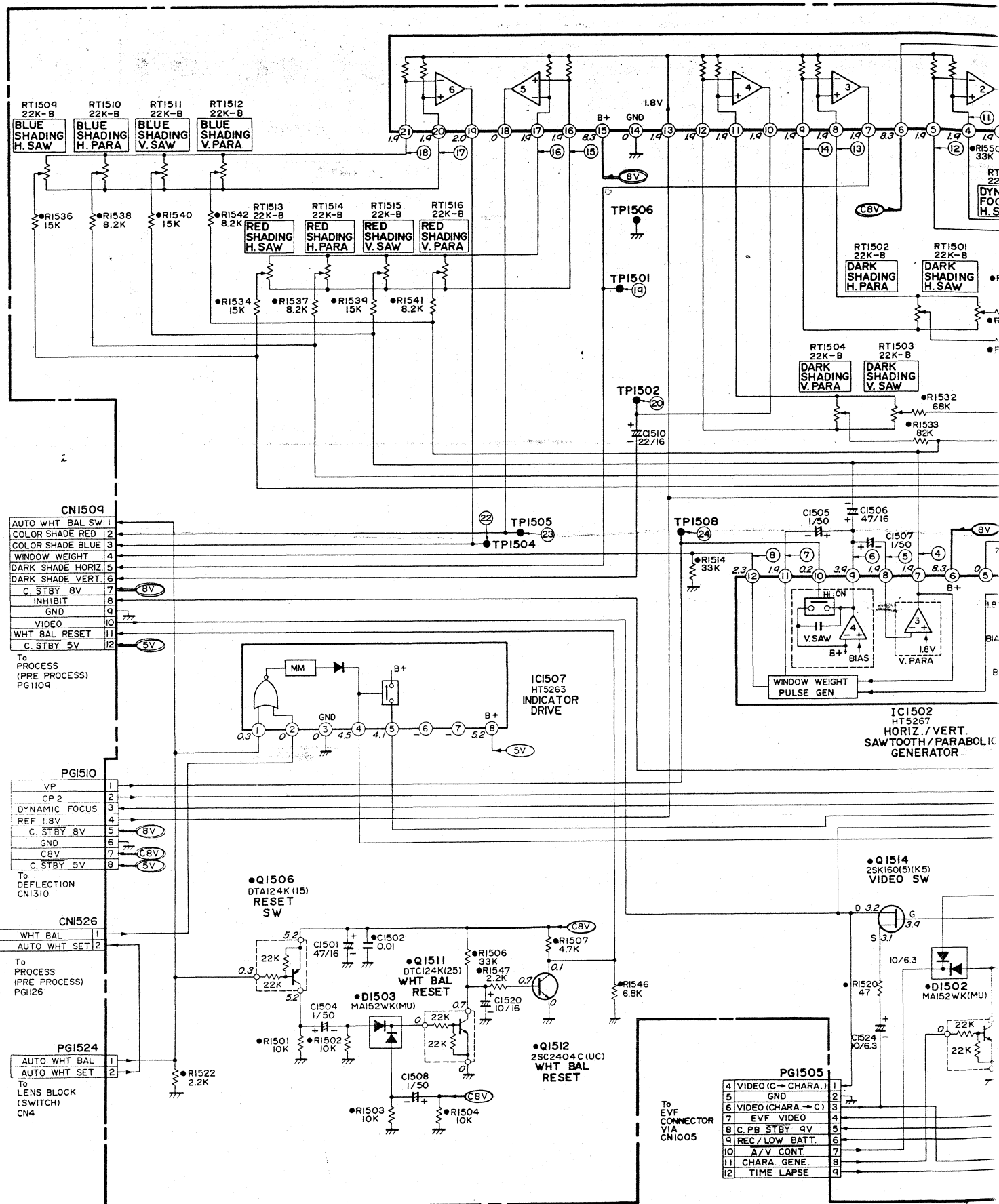
Soldered Side

Parts Side

Through hole

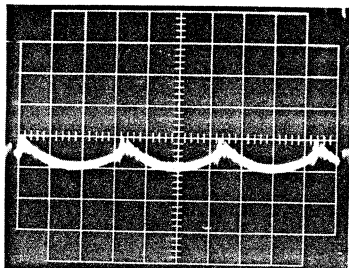
* NOTE : MARK "Z" IS LEADLESS JUMPER.
MARK "•" IS LEADLESS(CHIP) COMPONENT.

REGULATOR SCHEMATIC DIAGRAM

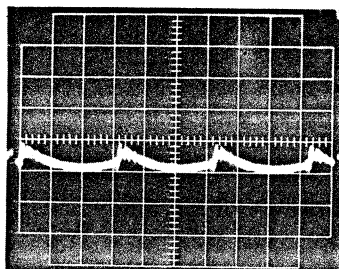


REGULATOR WAVEFORMS

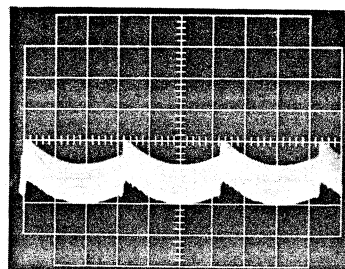
13-A IC1503-8
50mV/20 μ sec.cm



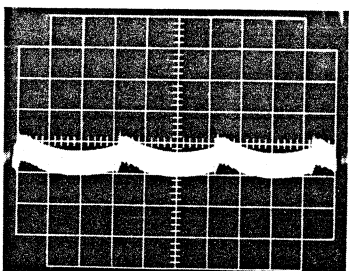
14-A IC1503-9
50mV/5msec.cm



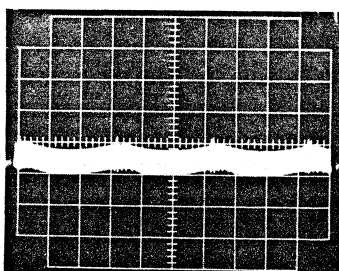
15-A IC1503-16
50mV/20 μ sec.cm



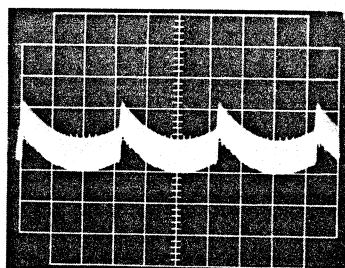
16-A IC1503-17
50mV/20 μ sec.cm



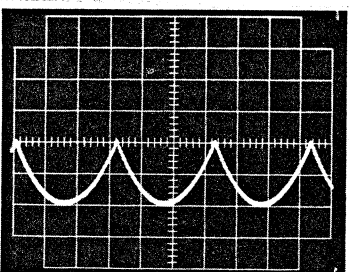
17-A IC1503-20
50mV/20 μ sec.cm



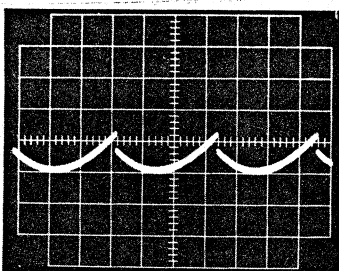
18-A IC1503-21
50mV/20 μ sec.cm



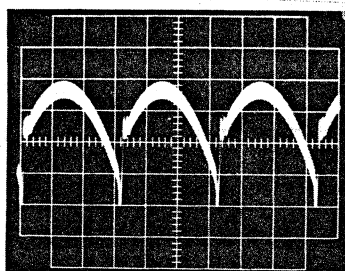
19-A TP1501
0.1V/20 μ sec.cm



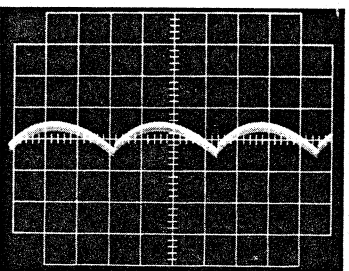
20-A TP1502
50mV/5msec.cm



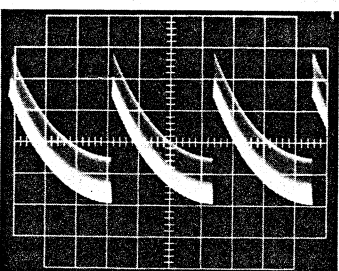
21-A TP1503
0.2V/20 μ sec.cm



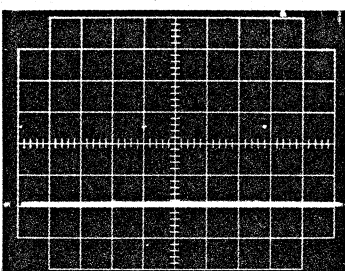
22-A TP1504
0.5V/5msec.cm



23-A TP1505
0.2V/5msec.cm



24-A TP1508
2V/5msec.cm



REGULATOR CIRCUIT BOARD

Q1501

B	4.1
C	12.0
E	3.6

Q1502

B	4.5
C	5.2
E	5.2

Q1503

B	11.4
C	12.1
E	12.1

Q1504

B	4.8
C	0
E	0

Q1505

B	5.3
C	0
E	0

Q1506

B	0.3
C	5.2
E	5.2

Q1507

B	5.3
C	0
E	0

Q1510

B	0
C	9.8
E	0

Q1511

B	0
C	0.7
E	0

Q1512

B	0.7
C	0.1
E	0

Q1514

D	3.2
G	3.9
S	3.1

Q1515

B	0
C	3.9
E	0

Q1516

B	5.2
C	5.2
E	5.2

Q1520

B	3.8
C	9.1
E	3.1

IC1503

21	1.9
20	1.9
19	2.0
18	0
17	1.9
16	1.9
15	8.3
14	0
13	1.9
12	1.9
11	1.9
10	1.9
9	1.9
8	1.9
7	1.9
6	8.3
5	1.9
4	1.9
3	1.9
2	4.5
1	4.5

IC1502

12	2.3
11	1.9
10	0.2
9	3.9
8	1.9
7	1.9
6	8.3
5	0
4	1.9
3	1.9
2	3.9
1	1.4

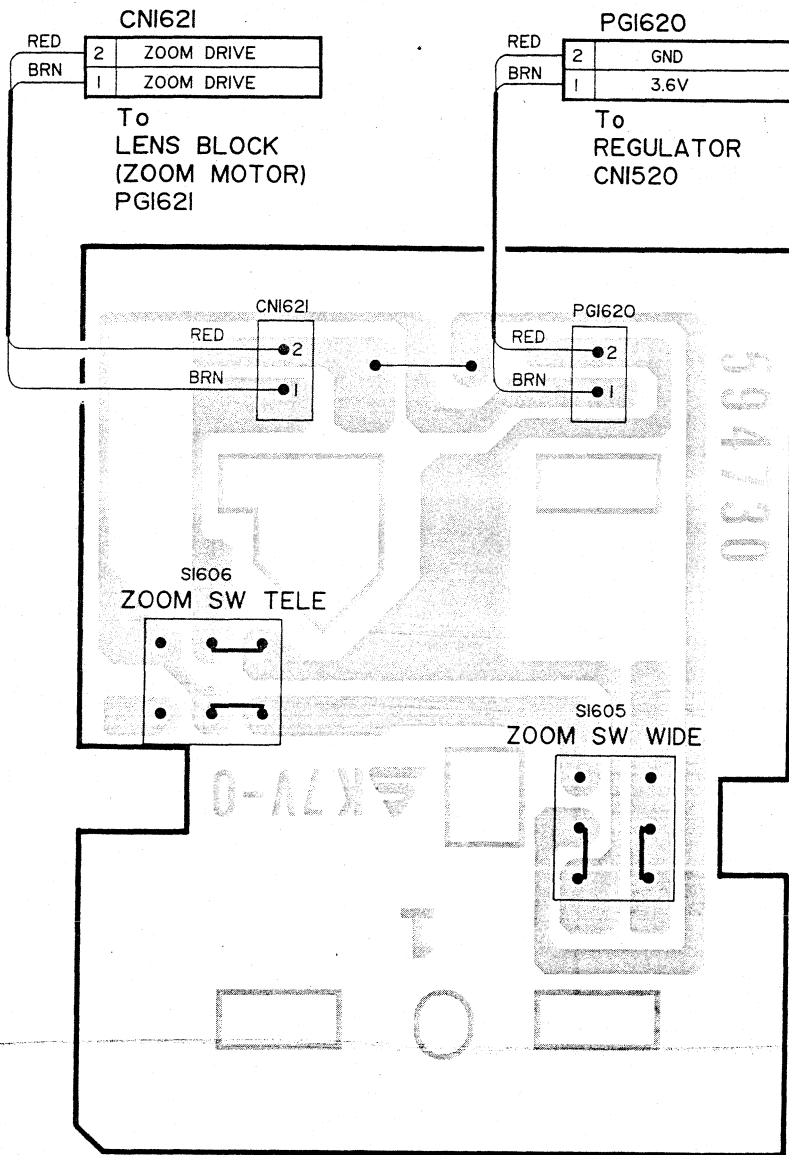
IC1506

1	2	3
12.1	0	9.1

IC1507

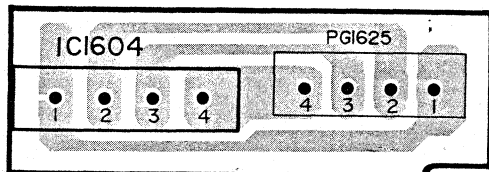
1	0.3
2	0
3	0
4	4.5
5	4.1
6	—
7	—
8	5.2

ZOOM SW CIRCUIT BOARD



ZOOM SW P.C.B

8V REG CIRCUIT BOARD



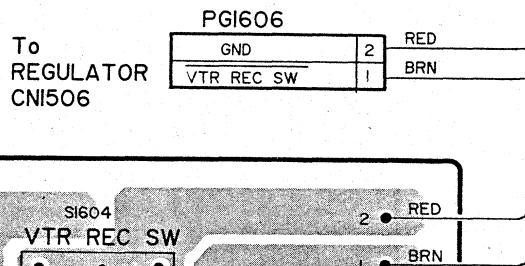
8V REG P.C.B

PGI625	
1	12V
2	COMMON
3	CBV
4	PWR SAVE

To
REGULATOR
CNI525

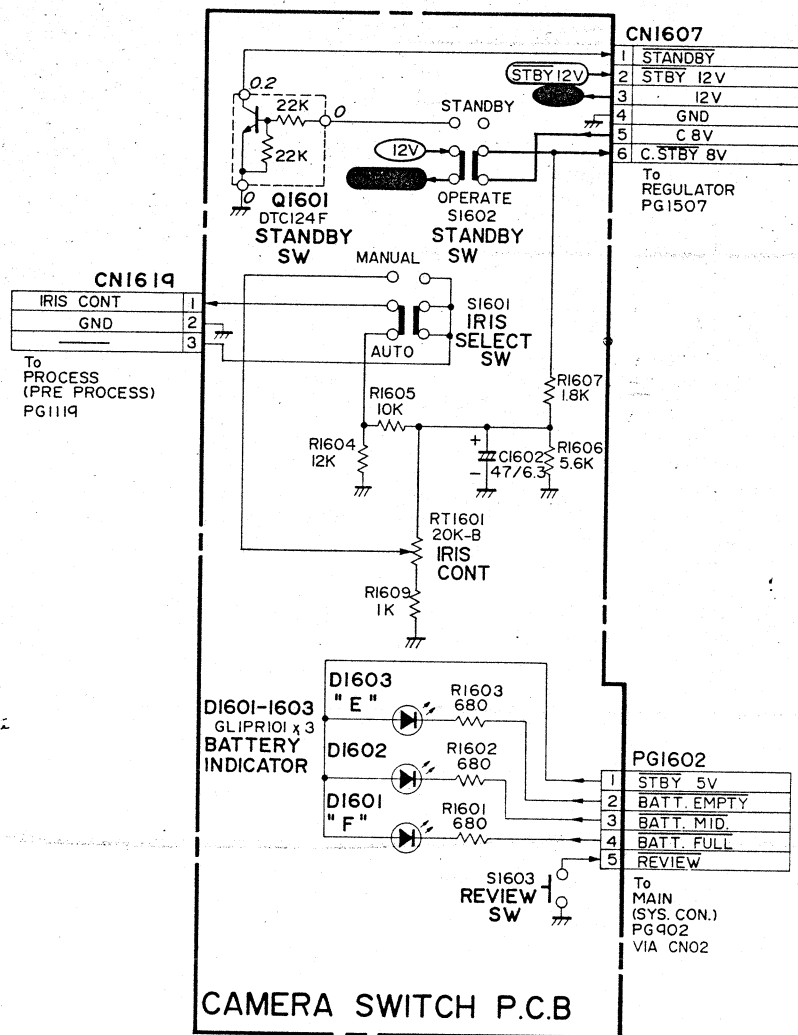
ICI604			
1	2	3	4
13.7	0.3	8.3	9.8

VTR REC SW CIRCUIT BOARD

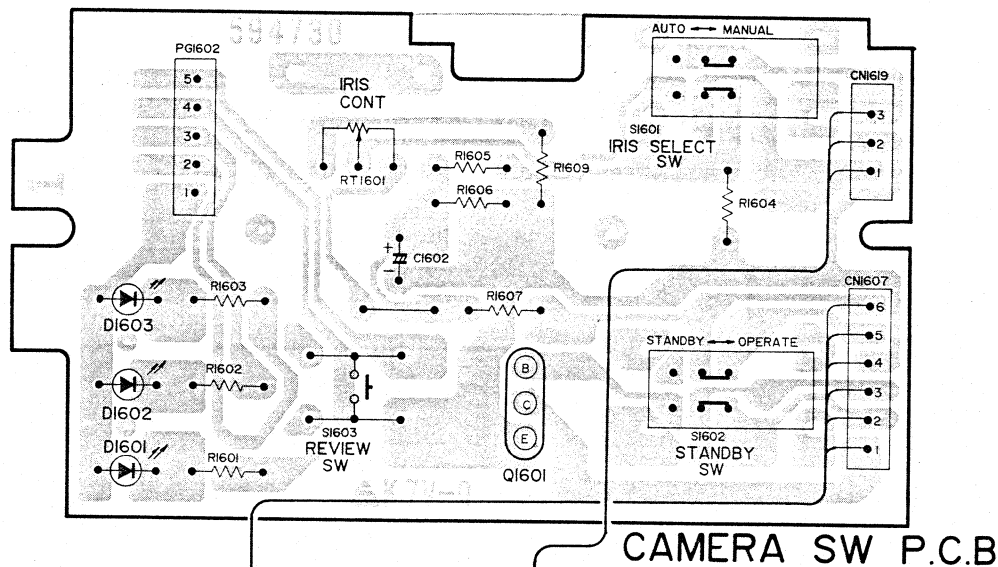


VTR REC SW P.C.B

CAMERA SWITCH SCHEMATIC DIAGRAM



CAMERA SWITCH CIRCUIT BOARD



PG1602

5	REVIEW
4	BATT. FULL
3	BATT. MID.
2	BATT. EMPTY
1	STBY 5V

To MAIN (SYS.CON.)
PG902
VIA CN02

CN1607

6	C. STBY 8V
5	C8V
4	GND
3	12V
2	STBY 12V
1	STANDBY

To REGULATOR
PG1507

CN1619

3	
2	GND
1	IRIS CONT

To PROCESS (PRE PROCESS)
PG1119

VM200E CAMERA SW BOARD

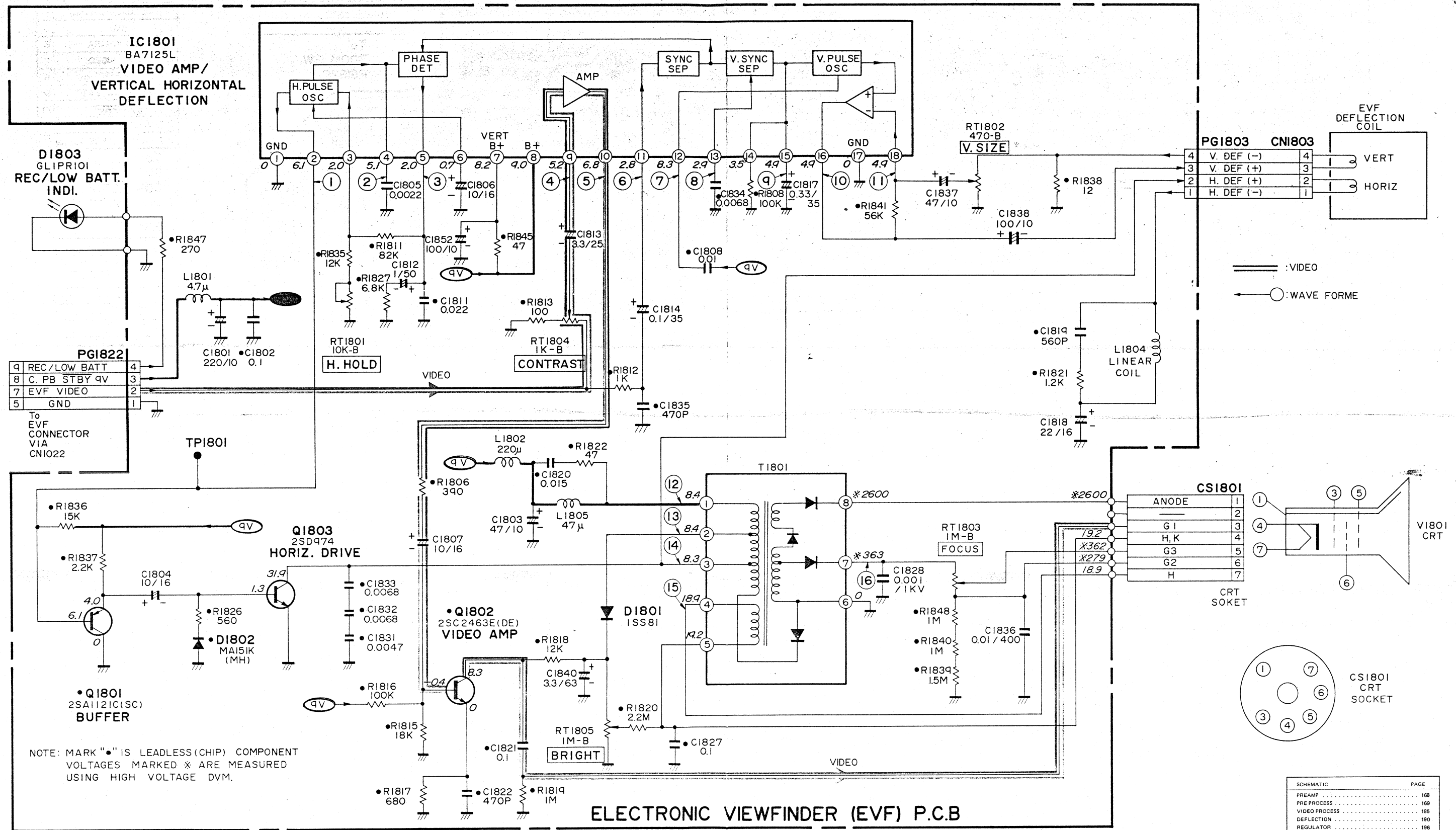
1

2

3

4

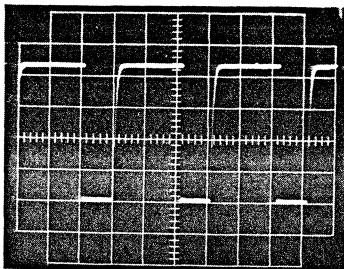
ELECTRONIC VIEWFINDER (EVF) SCHEMATIC DIAGRAM



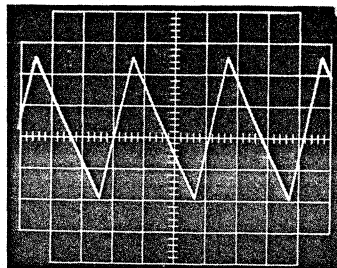
SCHEMATIC	PAGE
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SWITCHING REGULATOR	228
LUMA/CHROMA	229
FUNCTION SW	242
AUDIO	246
TROUBLE SENSOR	246

ELECTRONIC VIEWFINDER WAVEFORMS

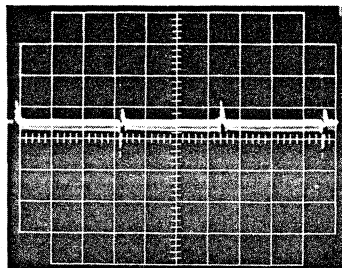
1-A IC1801-2
2V/20 μ sec.cm



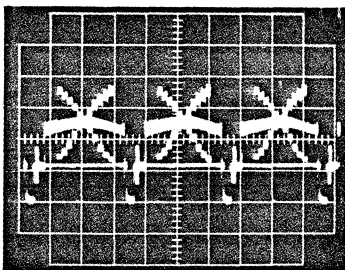
2-A IC1801-4
0.5V/20 μ sec.cm



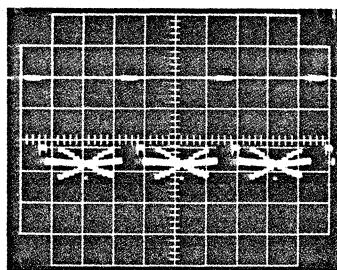
3-A IC1801-5
0.2V/20 μ sec.cm



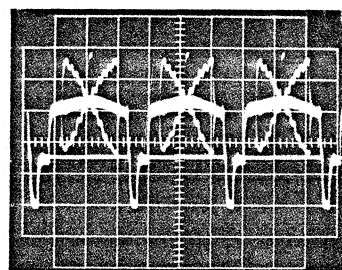
4-A IC1801-9
0.1V/20 μ sec. cm



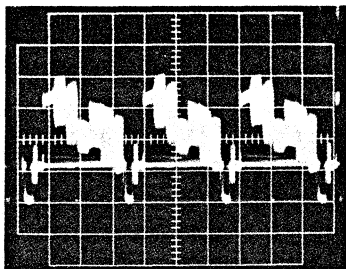
5-A IC1801-10
0.5V/20 μ sec. cm



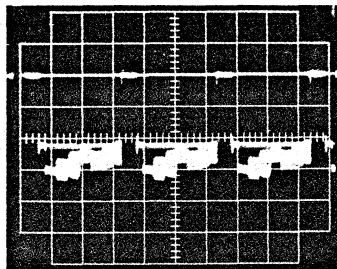
6-A IC1801-11
0.2V/20 μ sec. cm



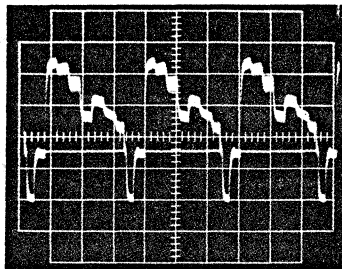
4-B IC1801-9 (Colour bar)
0.1V/20 μ sec. cm



5-B IC1801-10 (Colour bar)
0.5V/20 μ sec. cm

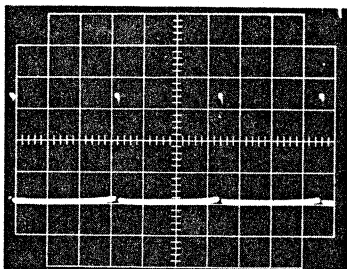


6-B IC1801-11 (Colour bar)
0.2V/20 μ sec. cm

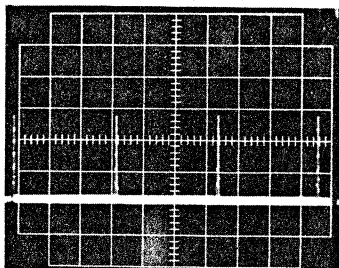


ELECTRONIC VIEWFINDER WAVEFORMS

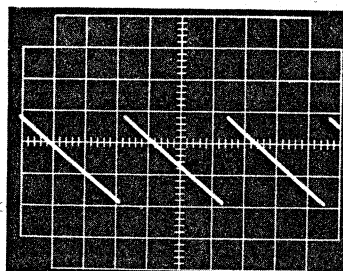
7-A IC1801-12
0.2V/5msec.cm



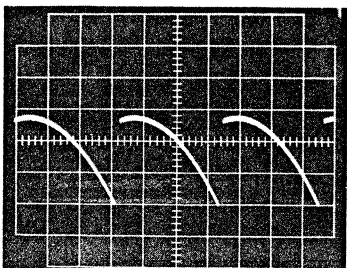
8-A IC1801-13
1V/5msec.cm



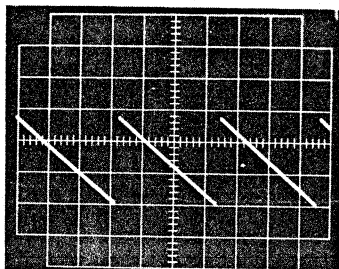
9-A IC1801-15
0.2V/5msec.cm



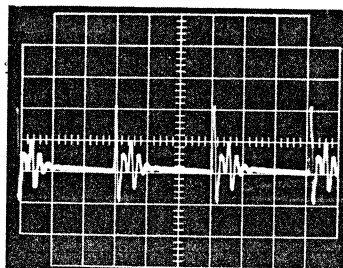
10-A IC1801-16
2V/5msec.cm



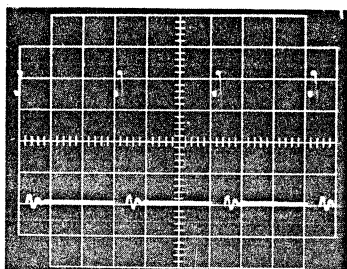
11-A IC1801-18
0.2V/5msec.cm



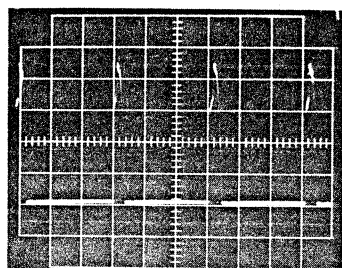
12-A T1801-1
5V/20 μ sec.cm



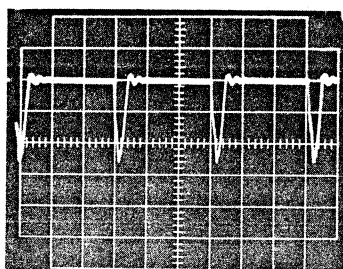
13-A T1801-2
10V/20 μ sec.cm



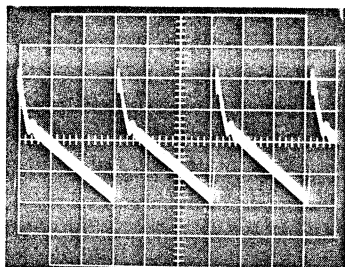
14-A T1801-3
20V/20 μ sec.cm



15-A T1801-4
1V/20 μ sec.cm

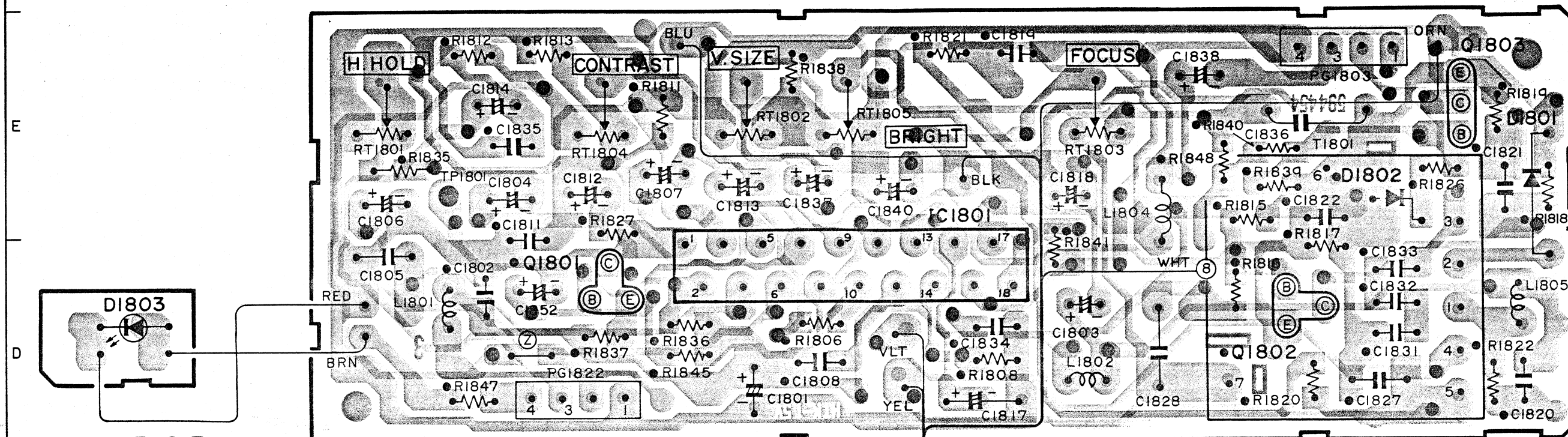


16-A T1801-7
2V/20 μ sec.cm



ELECTRONIC VIEWFINDER (EVF) CIRCUIT BOARD

MIC J



INDI. P.C.B

ELECTRONIC VIEWFINDER P.C.B

PG1803			
4	V. DEF (-)		
3	V. DEF (+)		
2	H. DEF (+)		
1	H. DEF (-)		

To
EVF
DEFLECTION
COIL
CNI803

PG1822			
4	REC/LOW BATT.	9	
3	C. PB STBY 9V	8	
2	EVF VIDEO	7	
1	GND	5	

To
EVF
CONNECTOR
VIA
CNI022

CS1801	
WHT	1 ANODE
	2
ORN	3 G1
YEL	4 H,K
BLK	5 G3
BLU	6 G2
VLT	7 H

To
CRT
SOCKET

- : Soldered Side
- : Parts Side
- : Through hole

* NOTE : MARK "Z" IS LEADLESS JUMPER.
MARK "•" IS LEADLESS (CHIP) COMPONENT.

IC1801								
1	3	5	7	9	11	13	15	17
0	2.0	2.0	8.2	5.2	2.8	2.9	4.9	0
2	4	6	8	10	12	14	16	18
6.1	5.1	0.7	9.0	6.8	8.3	3.5	4.9	4.9

Q1801	
B	6.1
C	0
E	4.0

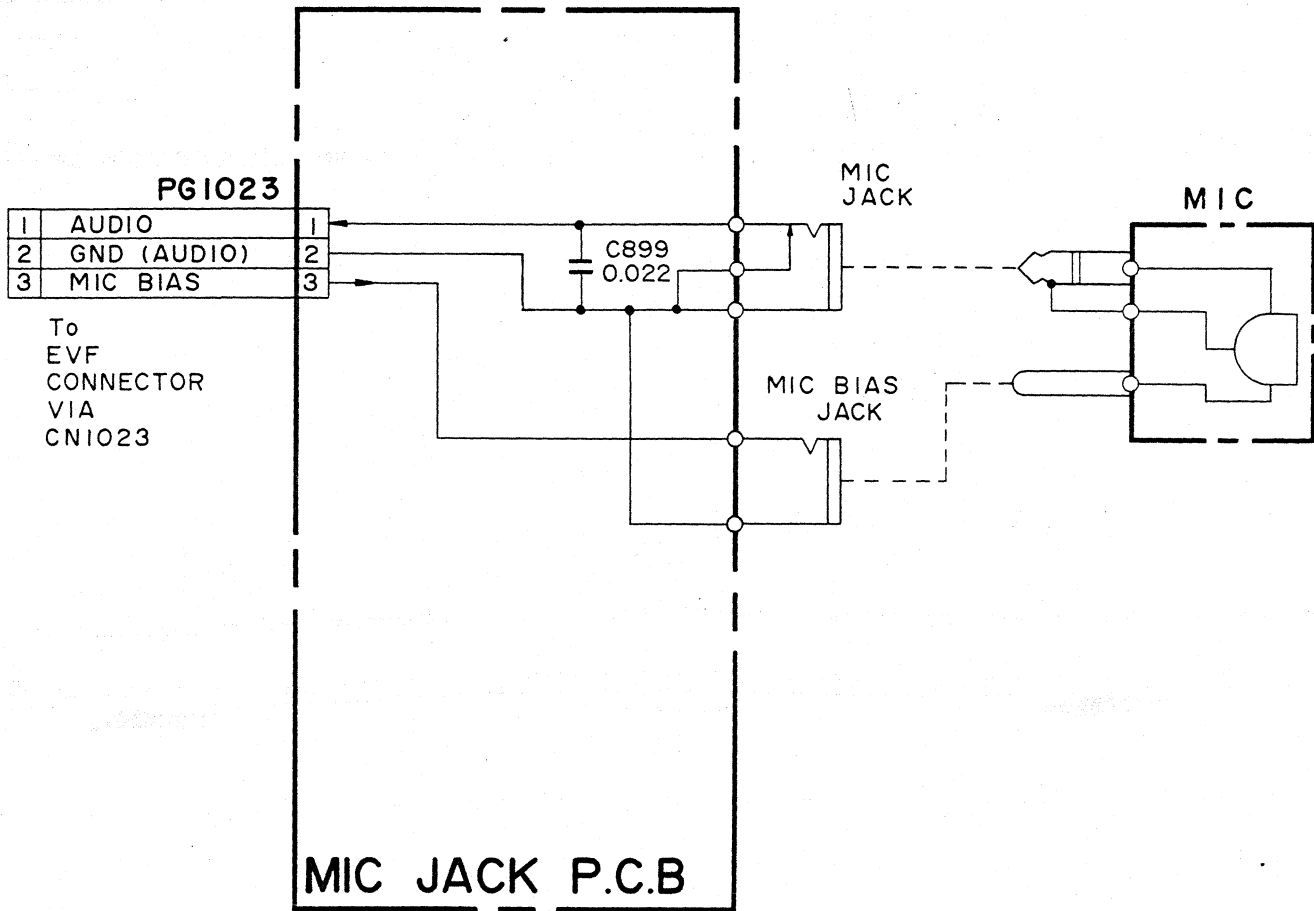
Q1802	
B	-0.4
C	8.3
E	0

Q1803	
B	1.3
C	31.9
E	-

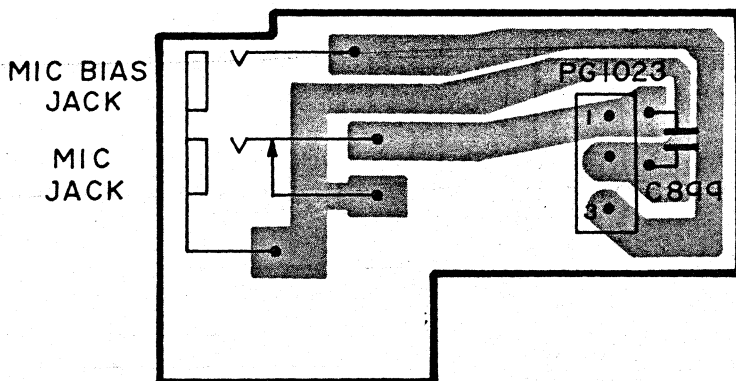
ELECTRONIC VIEWFINDER BOARD

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TROUBLE SENSOR	246

MIC JACK SCHEMATIC DIAGRAM



MIC JACK CIRCUIT BOARD DIAGRAM



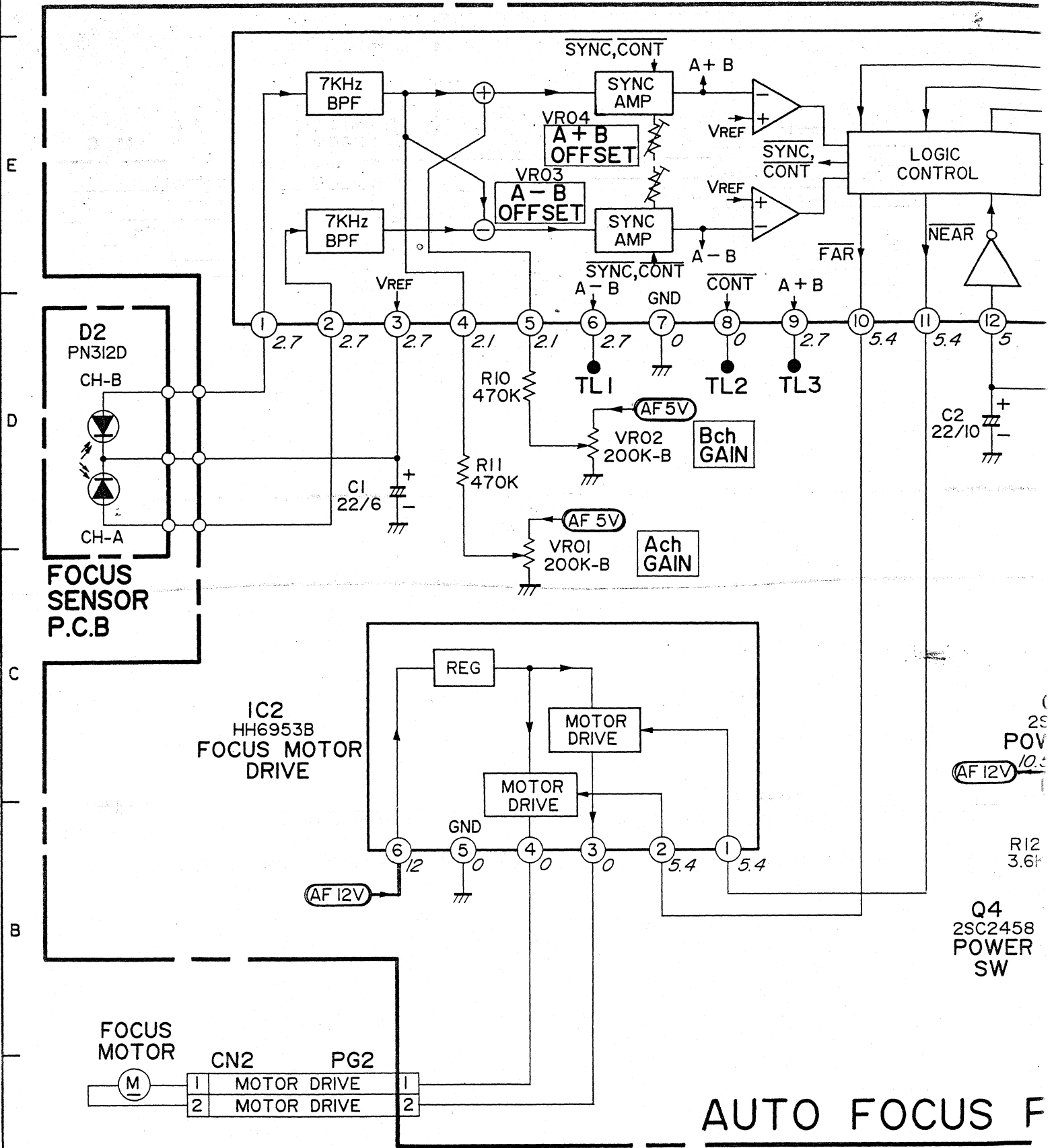
MIC JACK P.C.B

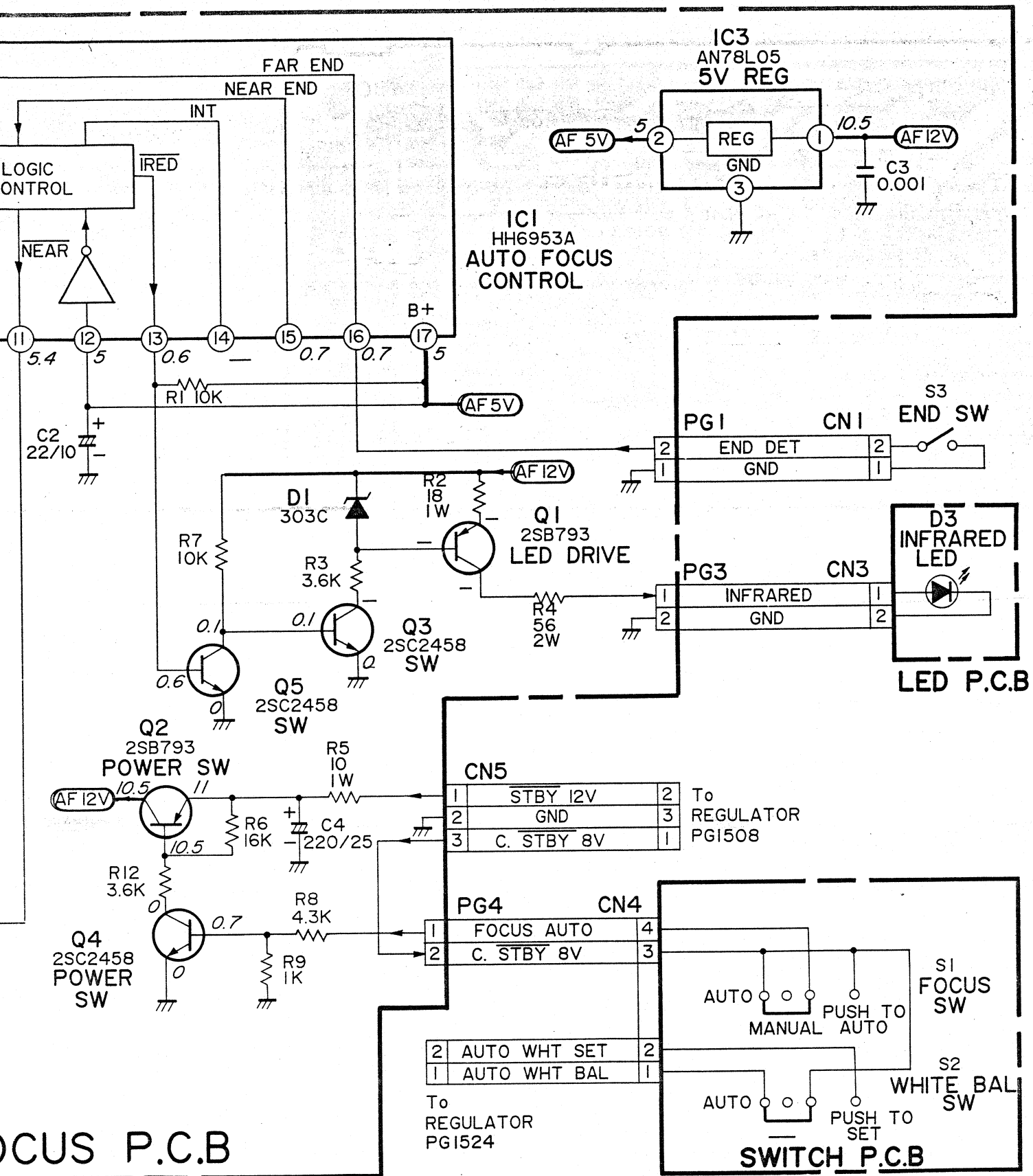
PG1023

1	AUDIO
2	GND (AUDIO)
3	MIC BIAS

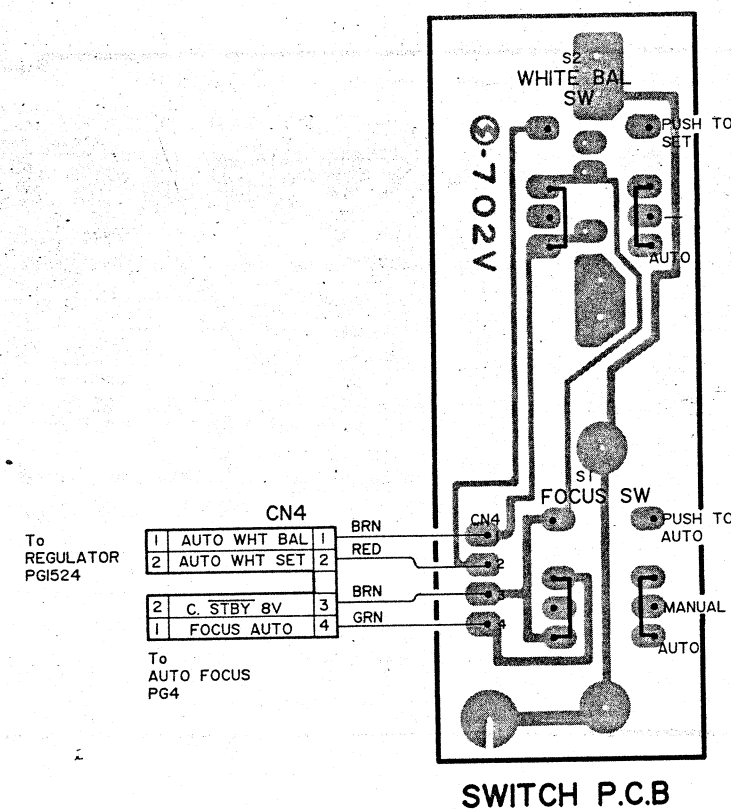
To
EVF
CONNECTOR
VIA
CN1023

AUTO FOCUS SCHEMATIC DIAGRAM





SWITCH CIRCUIT BOARD



AUTO FOCUS CIRCUIT BOARD

IC1			
1	2.7	10	5.4
2	2.7	11	5.4
3	2.7	12	5
4	2.1	13	0.6
5	2.1	14	—
6	2.7	15	0.7
7	0	16	0.7
8	0	17	5
9	2.7		

IC2	
1	5.4
2	5.4
3	0
4	0
5	0
6	12

IC3	
1	10.5
2	5
3	—

Q1	
B	—
C	—
E	—

Q2	
B	10.5
C	10.5
E	11

Q3	
B	0.1
C	—
E	0

Q4	
B	0.7
C	0
E	0

Q5	
B	0.6
C	0.1
E	0

PG3	
1	INFRARED
2	GND

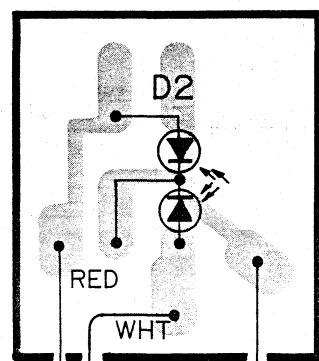
PG1	
1	GND
2	END DET

PG4	
2	C. STBY 8V
1	FOCUS AUTO

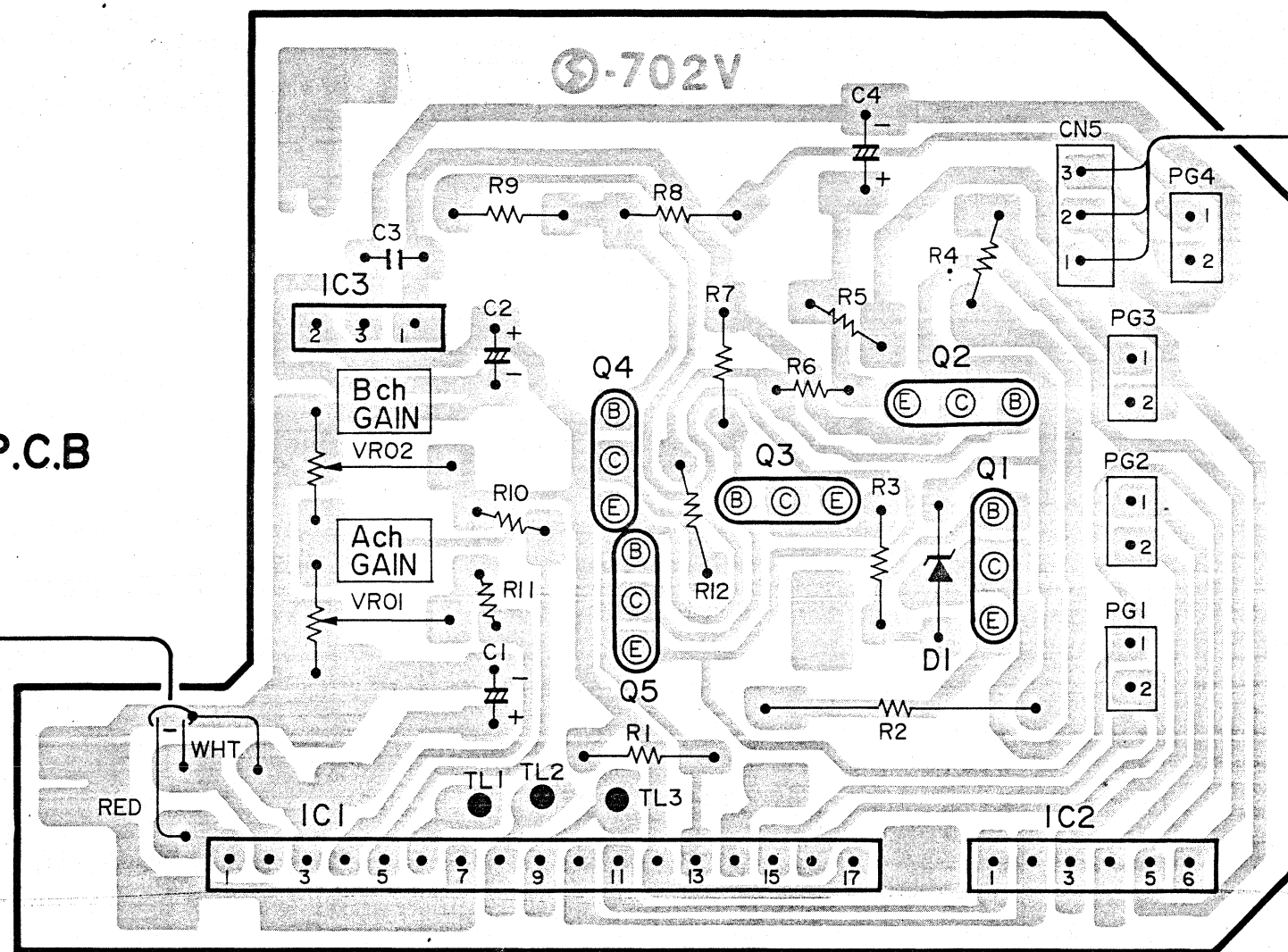
PG2	
1	FOCUS DRIVE
2	FOCUS DRIVE

SCHMATIC	PAGE	SCHMATIC	PAGE
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CAMERA SW	204	FUNCTION SW	242
ELECTRONIC VIEWFINDER	206	AUDIO	248
MIC JACK	211	TROUBLE SENSOR	248
AUTO FOCUS	212		

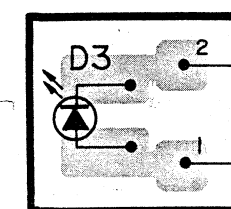
AUTO FOCUS P.C.B.



**FOCUS
SENSOR P.C.B**



AUTO FOCUS P.C.B



LED P.C.B

3	C. STBY 8V	1
2	GND	3
1	STBY 12V	2

To
REGULATOR
PGI508

CN3	
GND	2
INFRARED	1

To
AUTO FOCUS
PG3

F

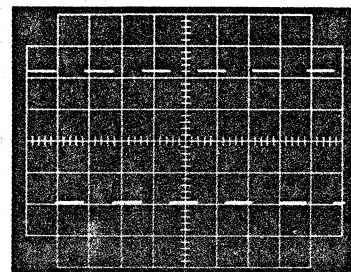
SYSTEM CONTROL 217



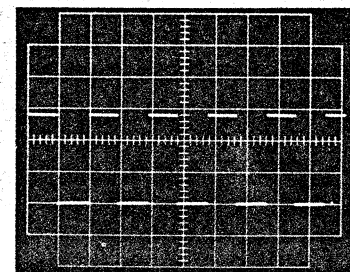
NOTE : MARK "●" IS LEADLESS (CHIP) COMPONENT.

SERVO WAVEFORMS

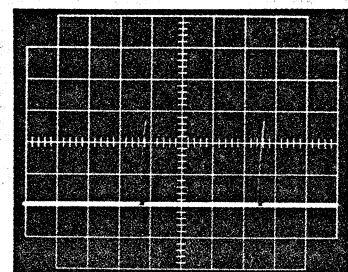
1-A IC601-2 REC/PLAY
1V/1 msec. cm



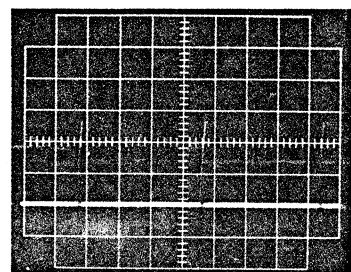
2-A IC601-6 REC/PLAY
1V/1 msec. cm



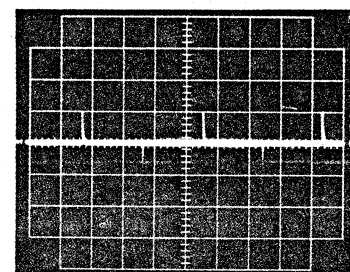
3-A IC601-12 REC/PLAY
1V/10 msec. cm



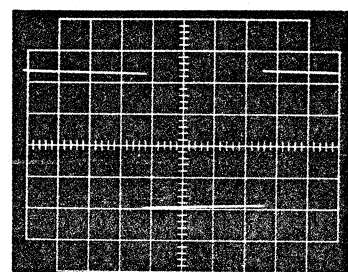
4-A IC601-13 REC/PLAY
1V/10 msec. cm



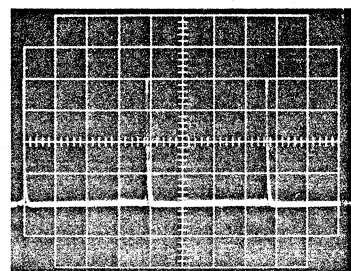
5-A IC601-14 REC/PLAY
1V/10 msec. cm



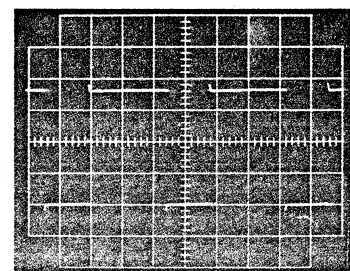
6-A IC601-15 REC/PLAY
1V/5 msec. cm



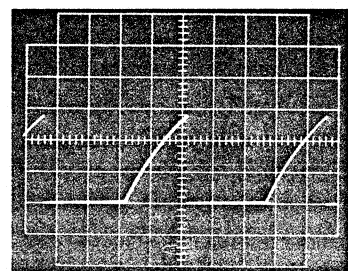
7-A IC601-17 REC/PLAY
0.2V/5 msec. cm



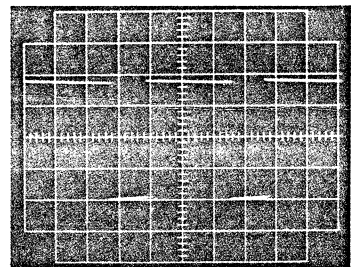
8-A IC601-18 REC
1V/10 msec. cm



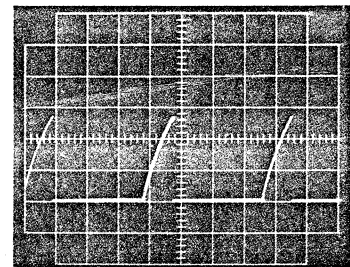
9-A IC601-19 REC/PLAY
1V/10 msec. cm



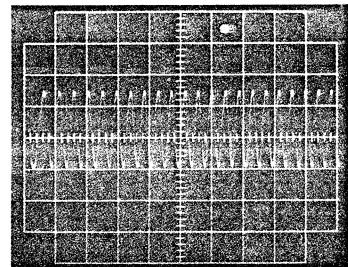
10-A IC601-21 PLAY
1V/10 msec. cm



11-A IC601-22 PLAY
1V/10 msec. cm

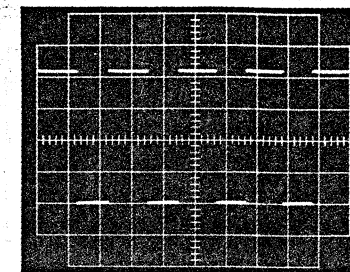


12-A IC601-25 REC/PLAY
0.1V/0.2 μsec. cm

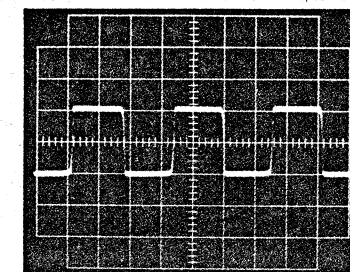


SERVO WAVEFORMS

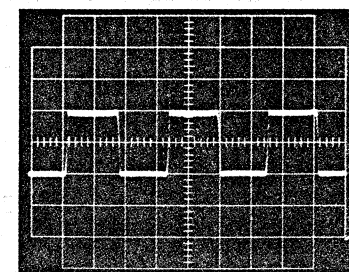
13-A IC601-29 REC/PLAY
1V/0.2 msec. cm



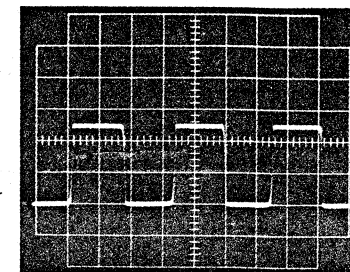
14-A IC602-2 REC/PLAY
50 mV/1 msec. cm



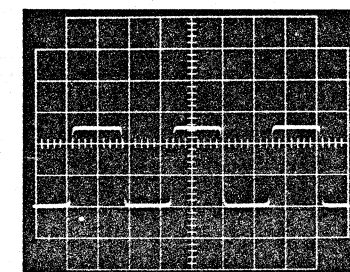
15-A IC602-3 REC/PLAY
50 mV/1 msec. cm



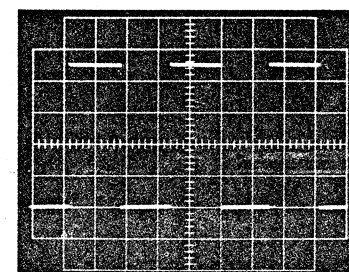
16-A IC602-4 REC/PLAY
1V/1 msec. cm



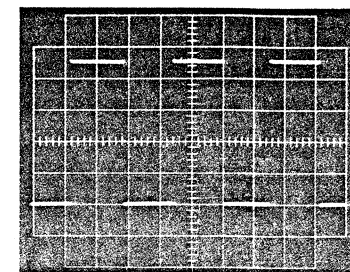
17-A IC602-5 REC/PLAY
1V/1 msec. cm



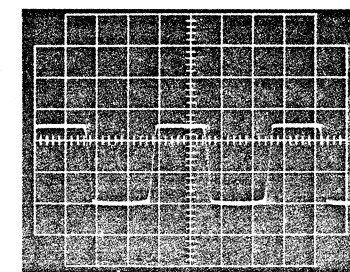
18-A IC602-6 REC/PLAY
1V/1 msec. cm



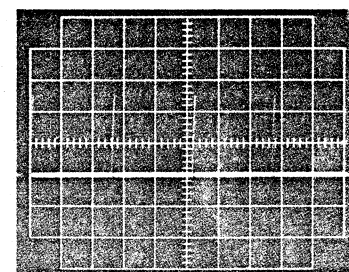
19-A IC602-11 REC/PLAY
1V/1 msec. cm



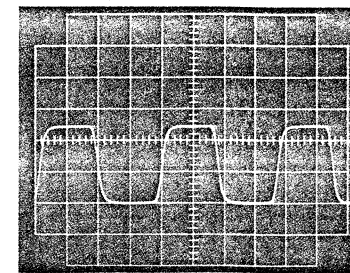
20-A IC602-12 REC/PLAY
1V/10 msec. cm



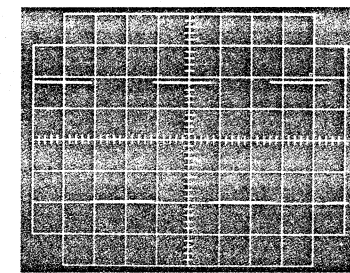
21-A IC603-4 REC/PLAY
1V/0.5 msec. cm



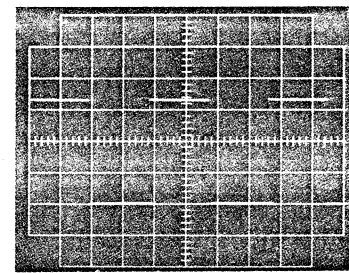
22-A IC603-5 REC/PLAY
1V/0.5 msec. cm



23-A IC603-6 REC/PLAY
1V/0.5 msec. cm

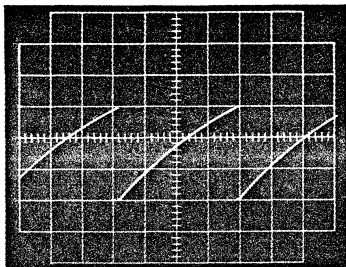


24-A IC603-11 REC/PLAY
1V/0.5 msec. cm

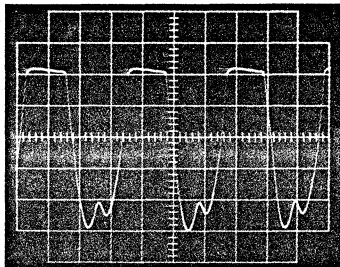


SERVO WAVEFORMS

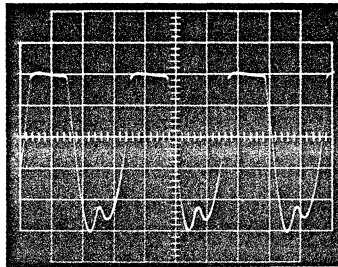
25-A IC603-12 REC/PLAY
1V/0.5 msec. cm



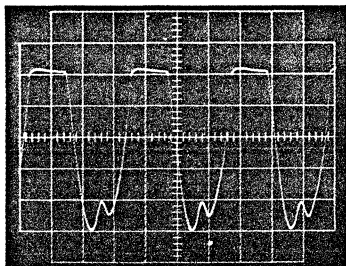
26-A IC605-15 REC/PLAY
1V/2 msec. cm



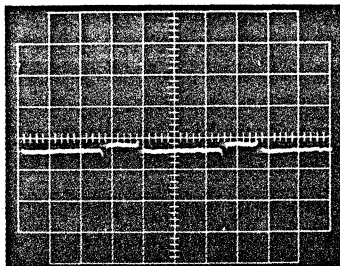
27-A IC605-16 REC/PLAY
1V/2 msec. cm



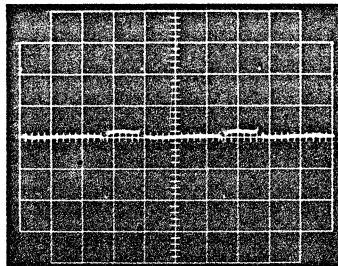
28-A IC605-17 REC/PLAY
1V/2 msec. cm



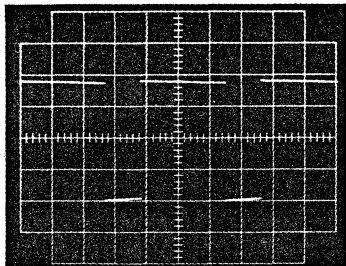
29-A IC606-3 PLAY
0.2V/10 msec. cm



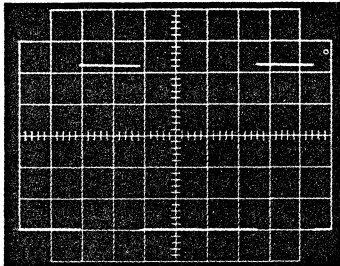
30-A IC606-5 PLAY
0.2V/10 msec. cm



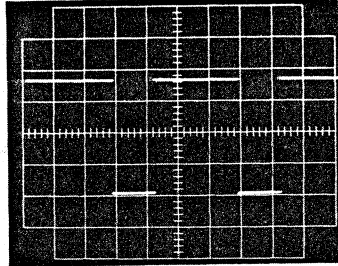
31-A IC606-6 PLAY
1V/10 msec. cm



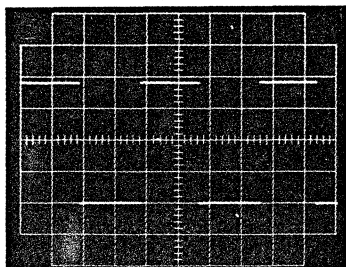
32-A IC608-1 REC/PLAY
1V/0.5 msec. cm



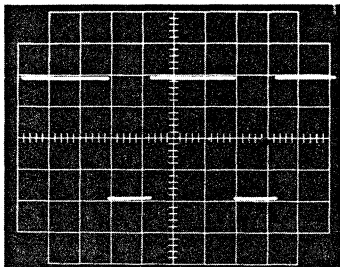
33-A IC608-2 REC/PLAY
1V/1msec. cm



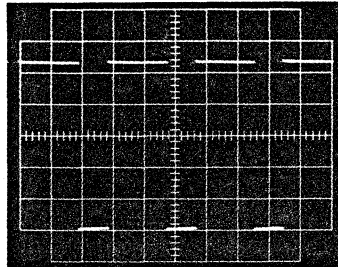
34-A IC608-3 REC/PLAY
1V/0.5 msec. cm



35-A IC608-5 REC/PLAY
1V/1msec. cm

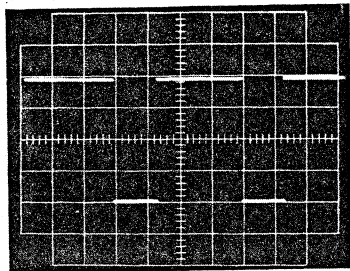


36-A IC608-9 REC/PLAY
1V/2 msec. cm

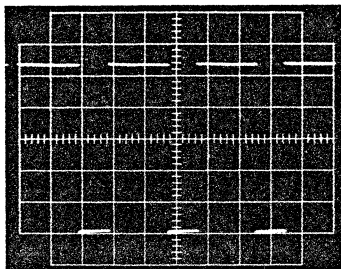


SERVO WAVEFORMS

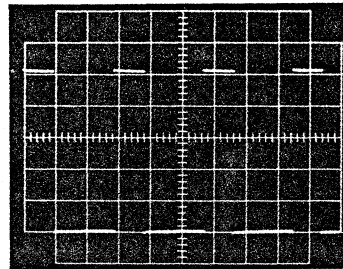
37-A IC608-11 REC/PLAY
1V/1msec.cm



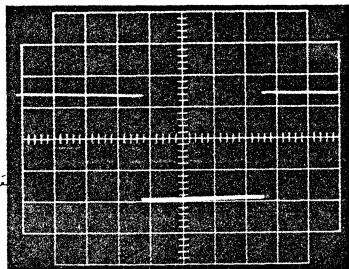
38-A IC608-12 REC/PLAY
1V/2 msec. cm



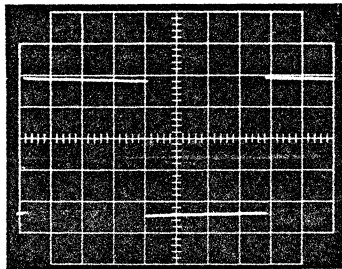
39-A IC608-13 REC/PLAY
1V/2 msec. cm



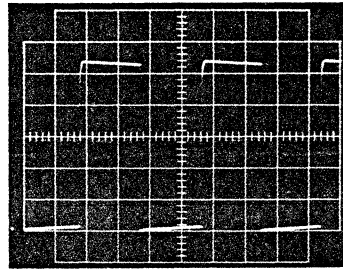
40-A IC609-1 REC/PLAY
0.2V/5 msec. cm



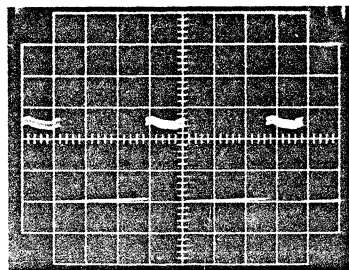
41-A IC610-2 REC/PLAY
1V/5 msec. cm



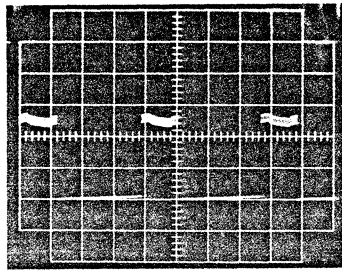
42-A IC610-3 REC/PLAY
1V/10 msec. cm



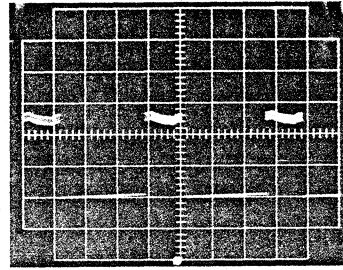
43-A IC610-6 REC
2V/20 msec. cm



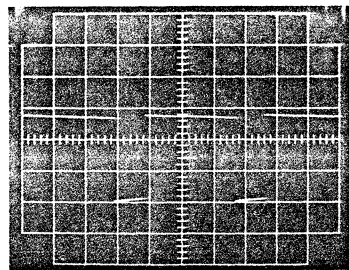
44-A IC610-7 REC
2V/20 msec. cm



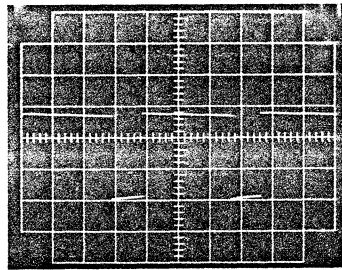
45-A IC610-8 REC
2V/20 msec. cm



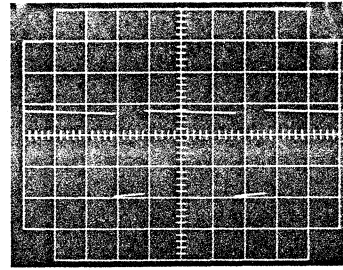
43-B IC610-6 PLAY
2V/20 msec. cm



44-B IC610-7 PLAY
2V/20 msec. cm

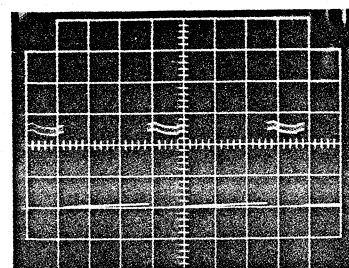


45-B IC610-8 PLAY
2V/20 msec. cm

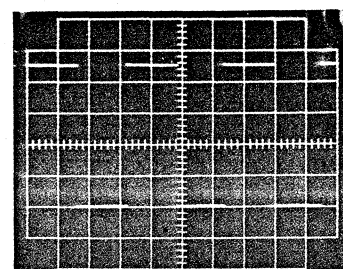


SERVO WAVEFORMS

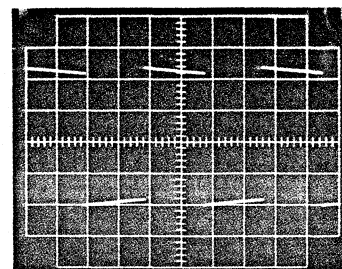
46-A IC610-9 REC
2V/20 msec. cm



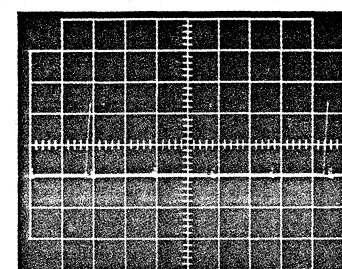
47-A IC610-17 REC/PLAY
1V/1 msec. cm



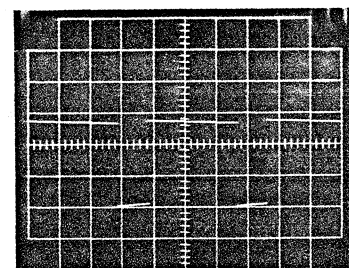
48-A IC610-19 REC
1V/20 msec. cm



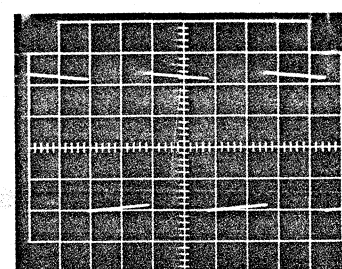
52-A PG610-7 REC/PLAY
1V/10 msec. cm



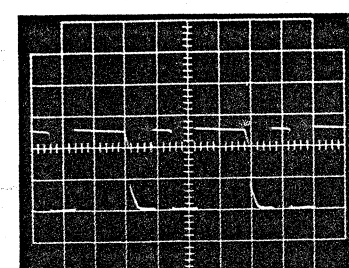
46-B IC610-9 PLAY
2V/20 msec. cm



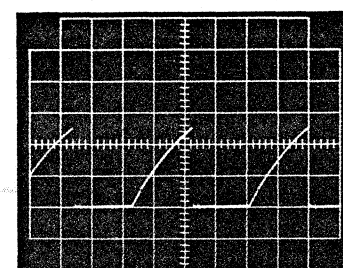
48-B IC610-19 PLAY
1V/20 msec. cm



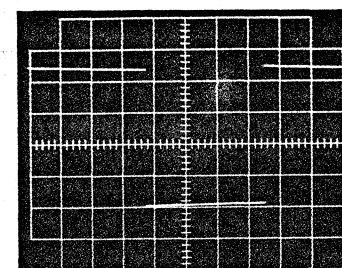
49-A PG610-1 REC
1V/10 msec. cm



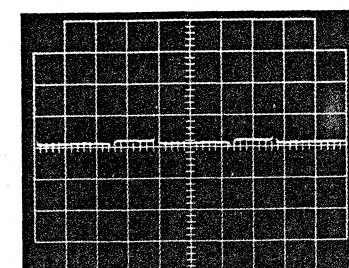
50-A PG610-3 REC/PLAY
1V/10 msec. cm



51-A PG610-5 REC/PLAY
1V/5 msec. cm

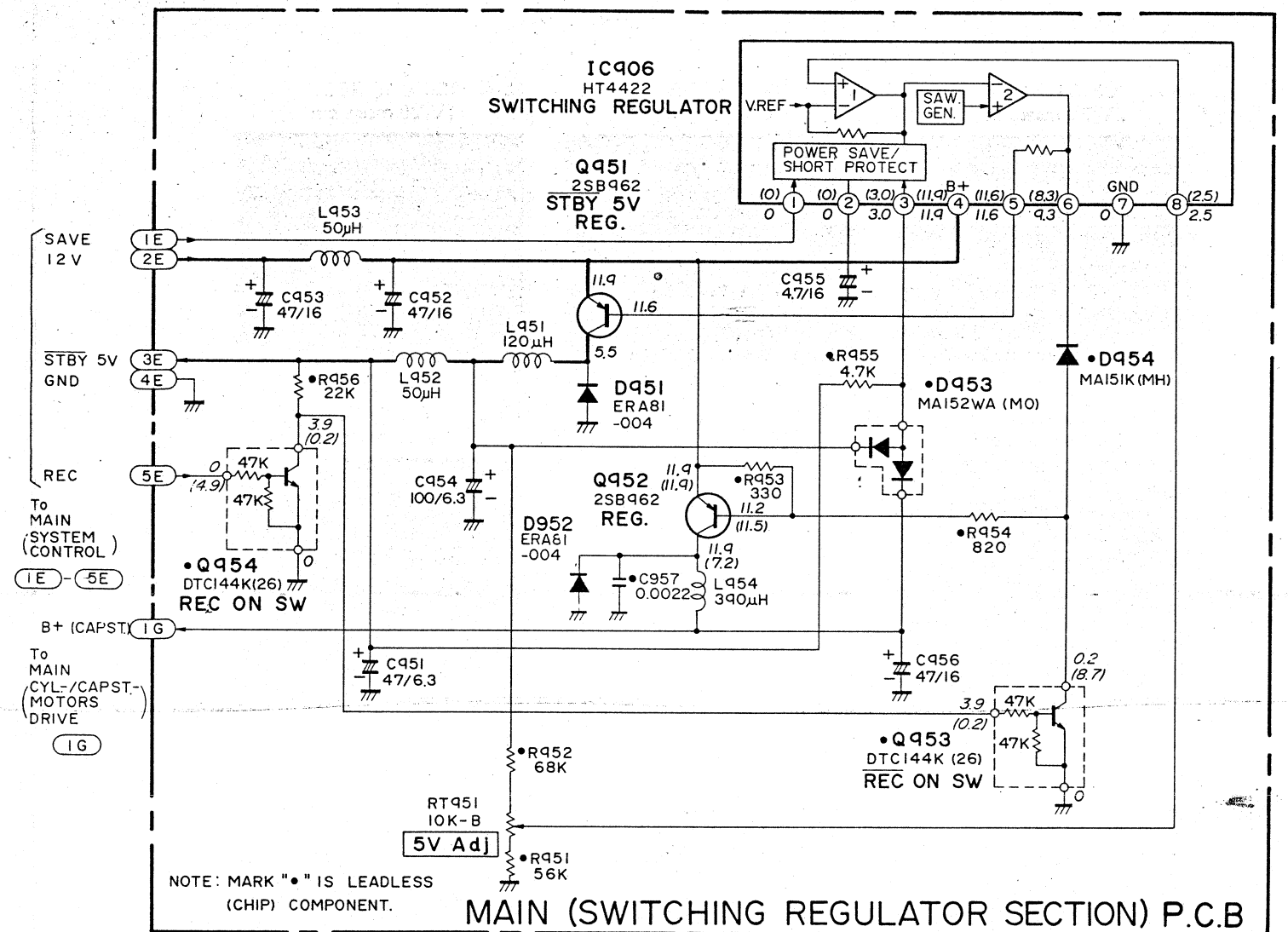
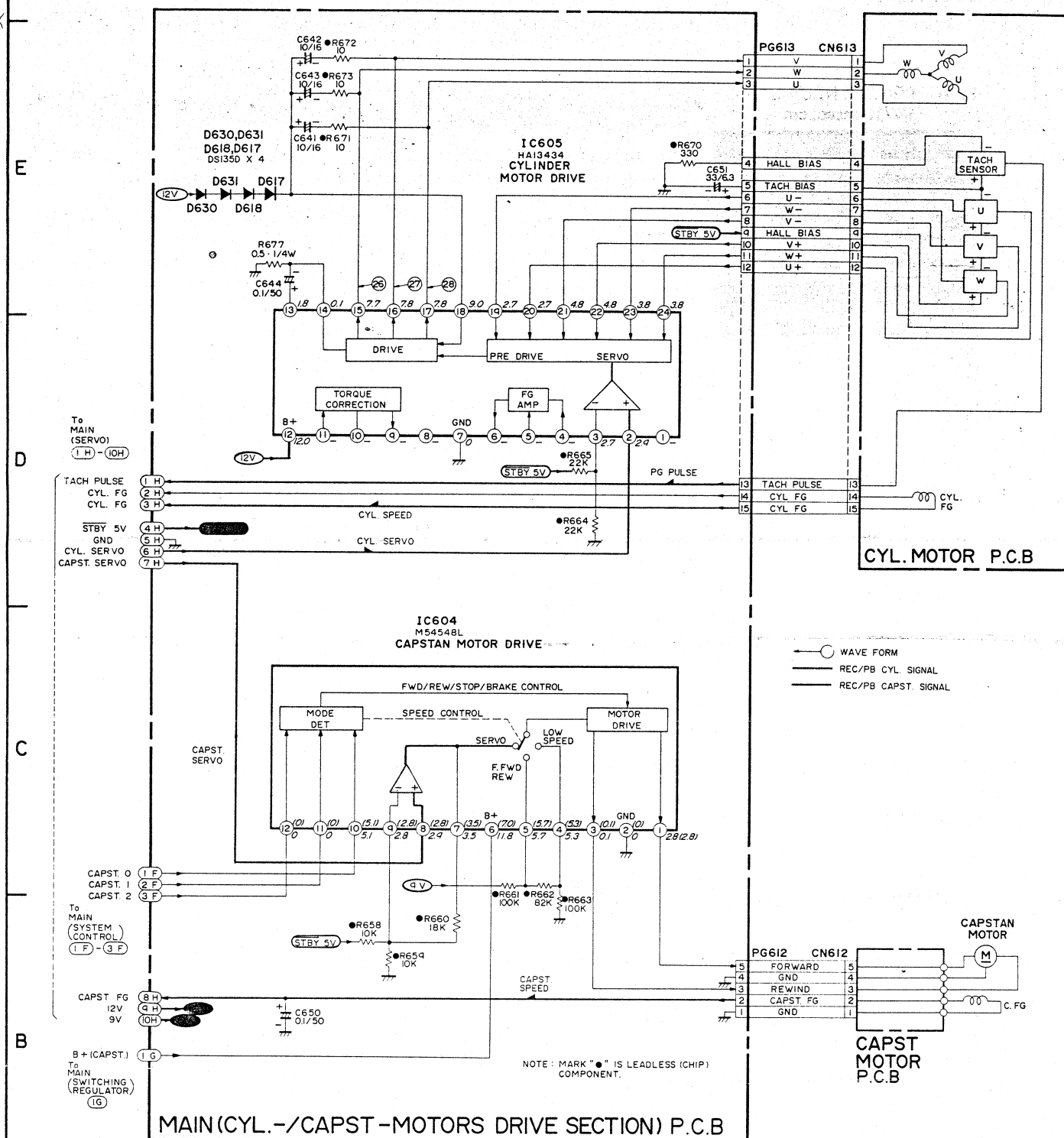


49-B PG610-1 PLAY
0.5V/10 msec. cm



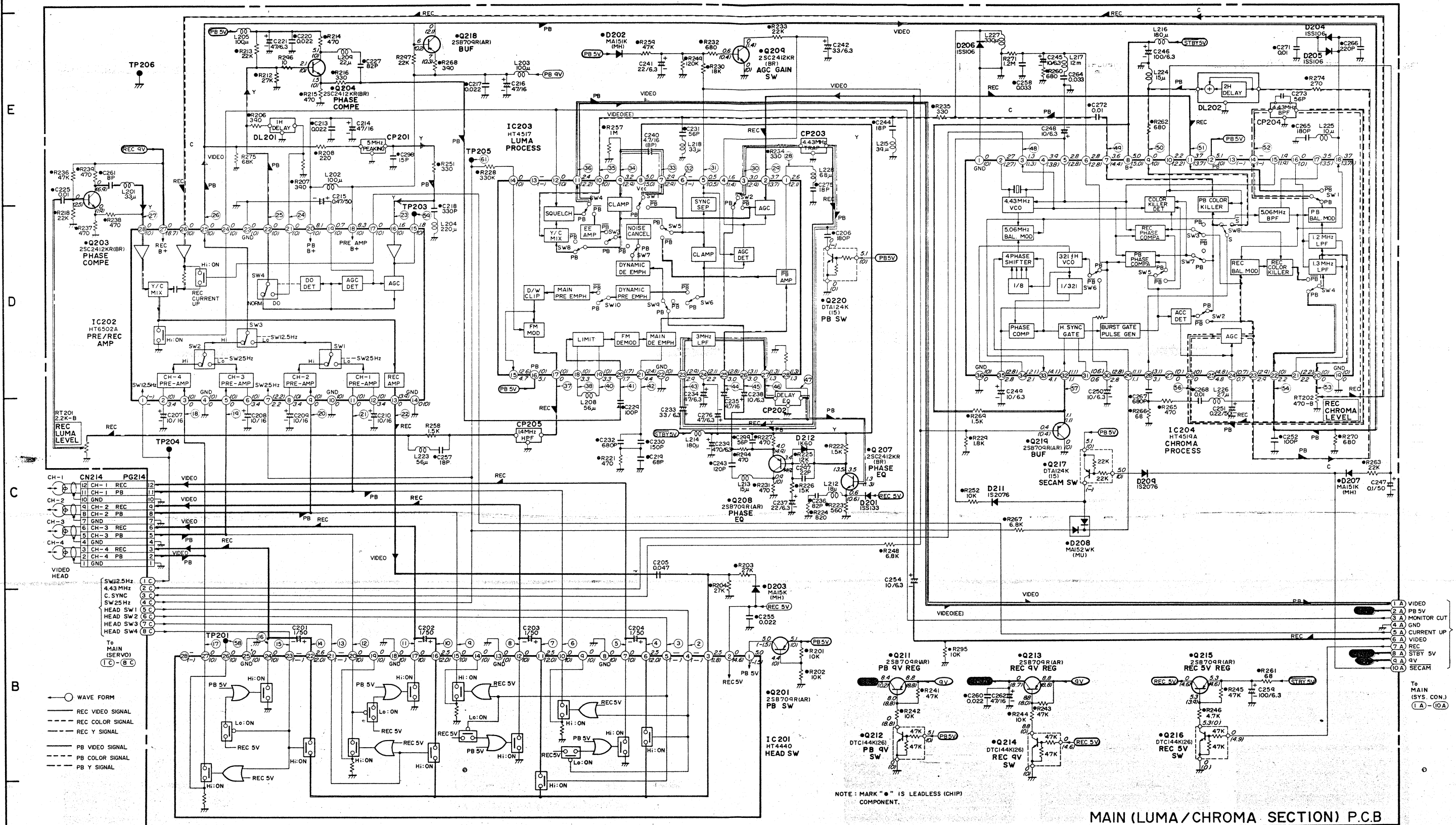
CYL. -/CAPST. - MOTORS DRIVE SCHEMATIC DIAGRAM

SWITCHING REGULATOR SCHEMATIC DIAGRAM



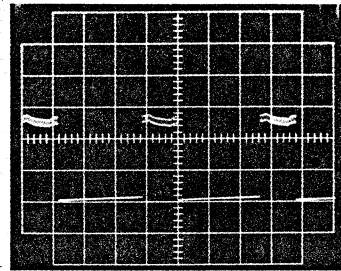
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PRE PROCESS	189
VIDEO PROCESS	195
DEFLECTION	190
REGULATOR	196
CAMERA SW	204
ELECTRONIC VIEWFINDER	206
MIC JACK	211
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CYL. -/CAPST. - MOTORS DRIVE	227
SWITCHING REGULATOR	228
LUMA/CHROMA	229
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TROUBLE SENSOR	245

LUMA/CHROMA SCHEMATIC DIAGRAM

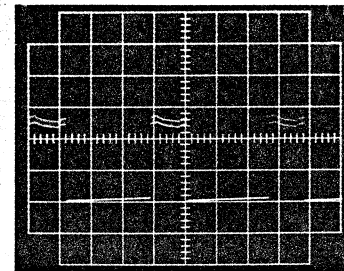


LUMA/CHROMA WAVEFORMS

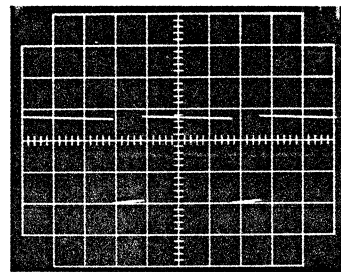
2-A IC201-4 REC
2V/20 msec. cm



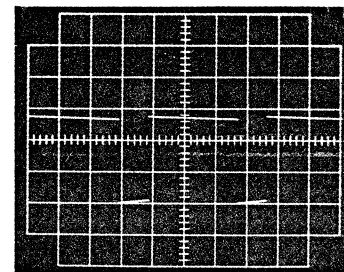
3-A IC201-5 REC
2V/20 msec. cm



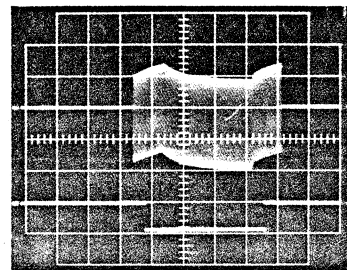
2-B IC201-4 PLAY
2V/20 msec. cm



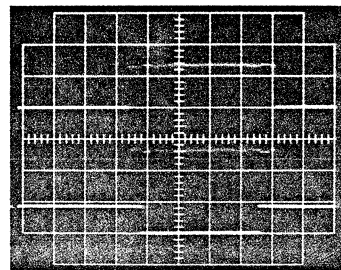
3-B IC201-5 PLAY
2V/20 msec. cm



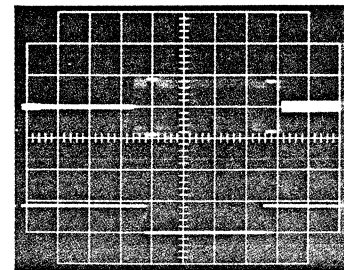
4-A IC201-6 REC
1V/5 msec. cm



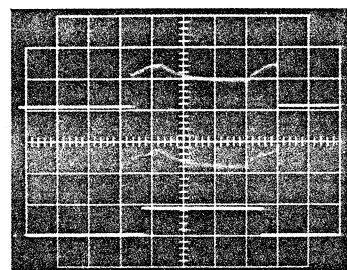
5-A IC201-7 REC
1V/5 msec. cm



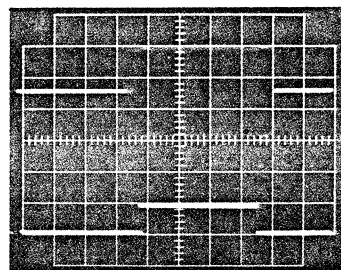
6-A IC201-10 REC
0.1V/5 msec. cm



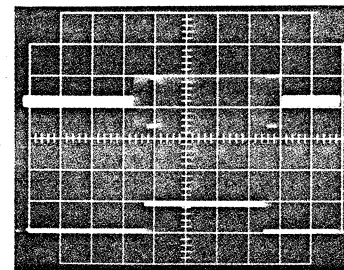
7-A IC201-11 REC
1V/5 msec. cm



8-A IC201-12 REC
1V/5 msec. cm

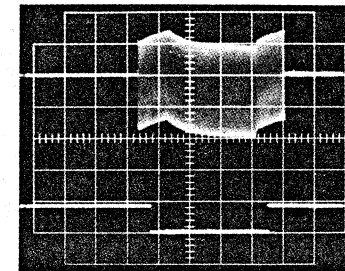


9-A IC201-15 REC
0.1V/5 msec. cm

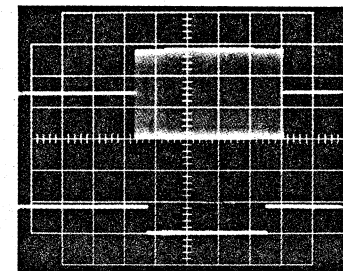


LUMA/CHROMA WAVEFORMS

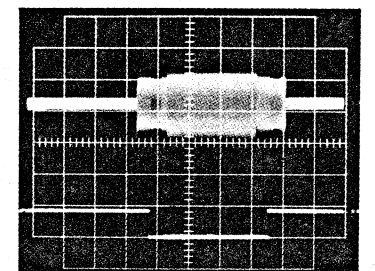
10-A IC201-16 REC
1V/5 msec. cm



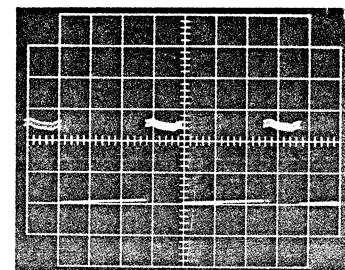
11-A IC201-17 REC
1V/5 msec. cm



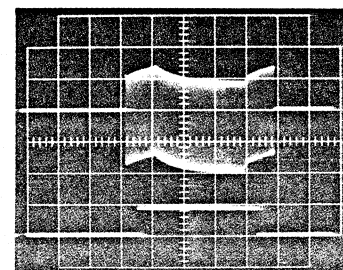
12-A IC201-20 REC
0.1V/5 msec. cm



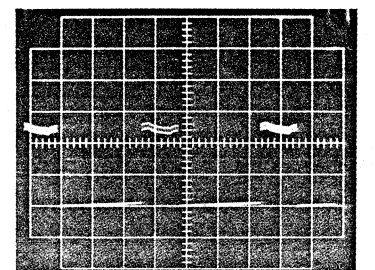
13-A IC201-21 REC
2V/20 msec. cm



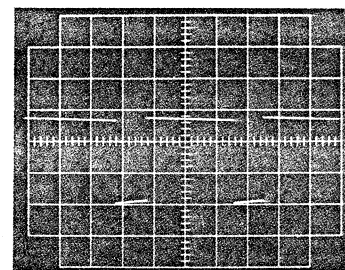
14-A IC201-22 REC
1V/5 msec. cm



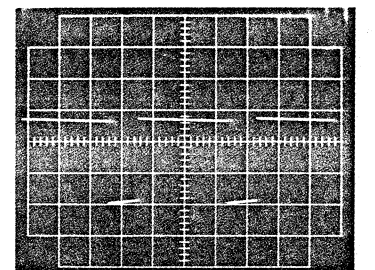
15-A IC201-23 REC
2V/20 msec. cm



13-B IC201-21 PLAY
2V/20 msec. cm

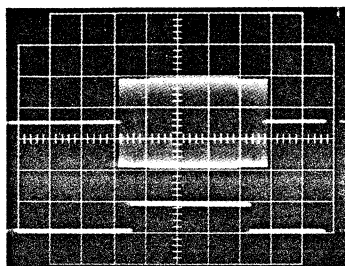


15-B IC201-23 PLAY
2V/20 msec. cm

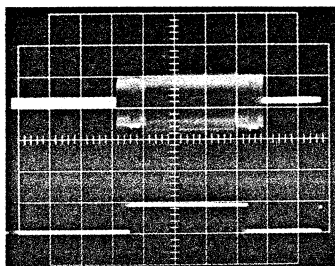


LUMA/CHROMA WAVEFORMS

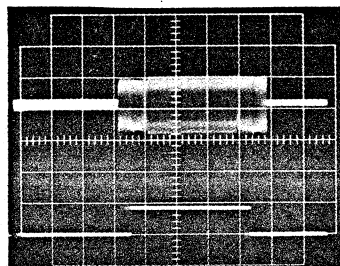
16-A IC201-24 REC
1V/5 msec. cm



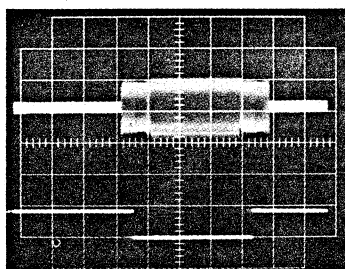
17-A IC201-27 REC
0.1V/5 msec. cm



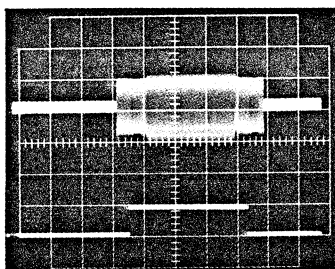
18-A IC202-3 REC
0.1V/5 msec. cm



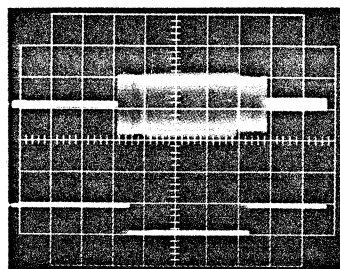
19-A IC202-5 REC
0.1V/5 msec. cm



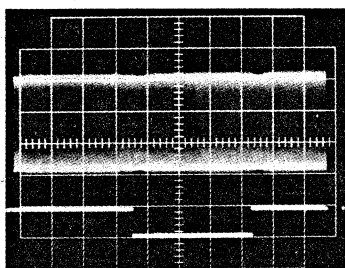
20-A IC202-9 REC
0.1V/5 msec. cm



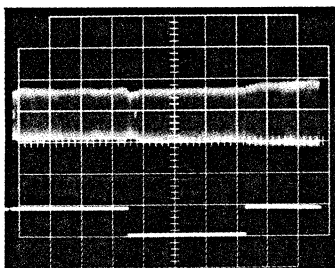
21-A IC202-11 REC
0.1V/5 msec. cm



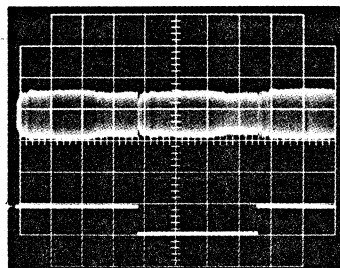
22-A IC202-13 REC
1V/5 msec. cm



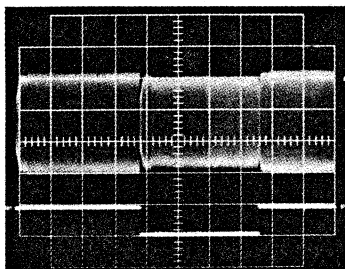
23-A IC202-16 PLAY
10 mV/5 msec. cm



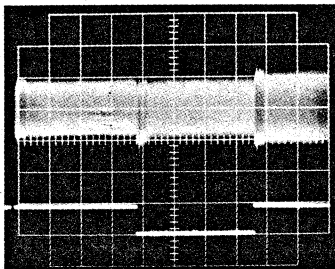
24-A IC202-21 PLAY
50 mV/5 msec. cm



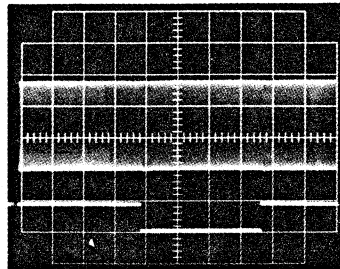
25-A IC202-22 PLAY
0.2V/5 msec. cm



26-A IC202-25 PLAY
50 mV/5 msec. cm

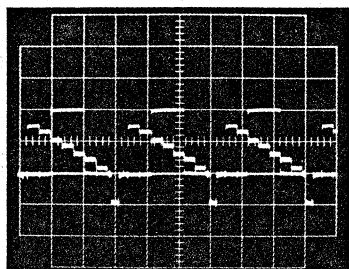


27-A IC202-28 REC
0.1V/5 msec. cm

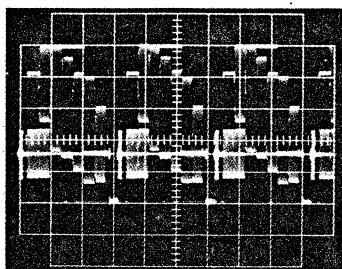


LUMA/CHROMA WAVEFORMS

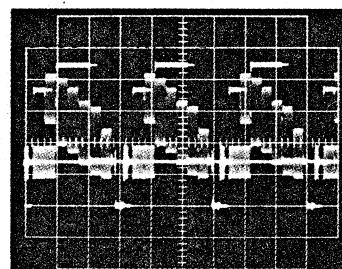
28-A IC203-1 REC
0.1V/20 μ sec. cm



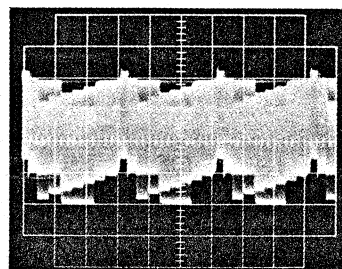
29-A IC203-2 REC
0.2V/20 μ sec. cm



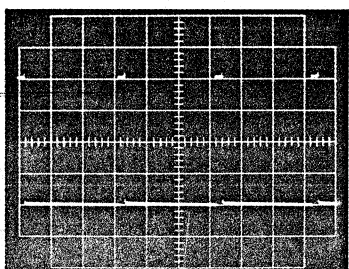
30-A IC203-3 REC
50 mV/20 μ sec. cm



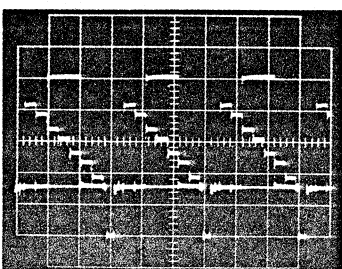
30-B IC203-3 PLAY
0.1V/20 μ sec. cm



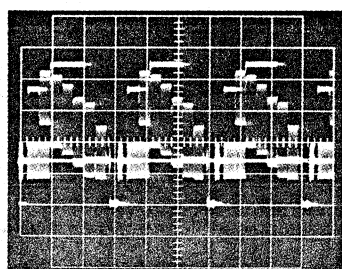
31-A IC203-5 REC/PLAY
1V/20 μ sec. cm



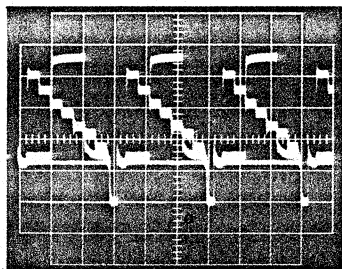
32-A IC203-6 REC/PLAY
0.2V/20 μ sec. cm



33-A IC203-7 REC
50 mV/20 μ sec. cm

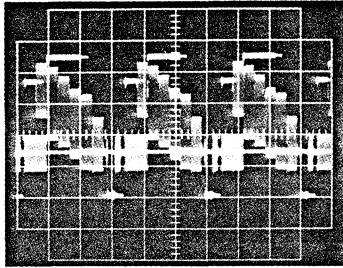


33-B IC203-7 PLAY
0.2V/20 μ sec. cm

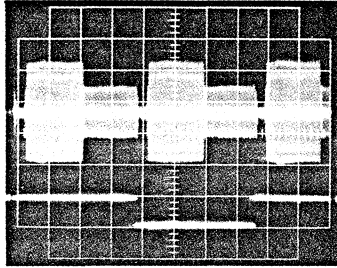


LUMA/CHROMA WAVEFORMS

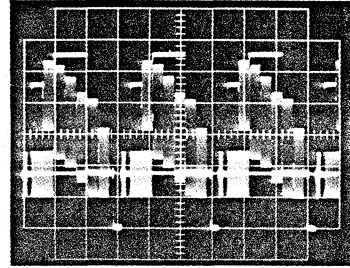
34-A IC203-9 REC
50 mV/20 μ sec. cm



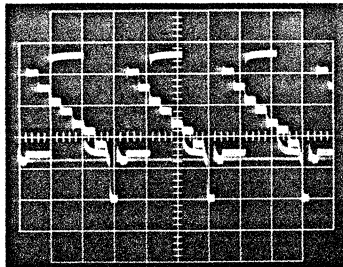
35-A IC203-10 PLAY
50 mV/5 msec. cm



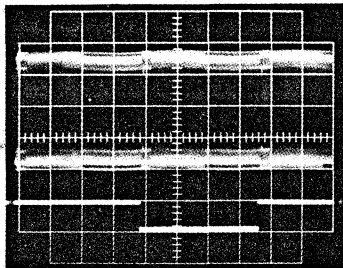
36-A IC203-11 REC/PLAY
0.2V/20 μ sec. cm



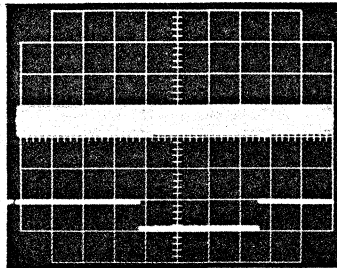
34-B IC203-9 PLAY
0.2V/20 μ sec. cm



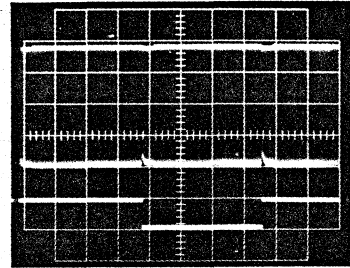
37-A IC203-17 REC/PLAY
0.2V/5 msec. cm



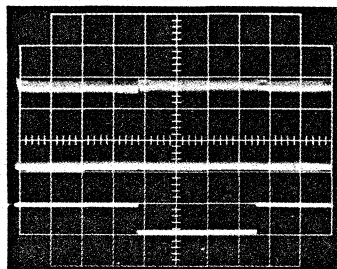
38-A IC203-18 REC
50 mV/5 msec. cm



40-A IC203-19 PLAY
0.2V/5 msec. cm

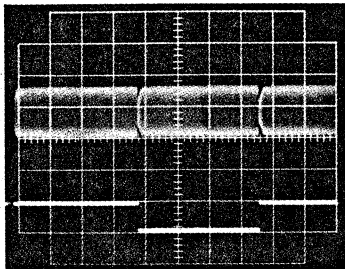


38-B IC203-18 PLAY
0.2V/5 msec. cm

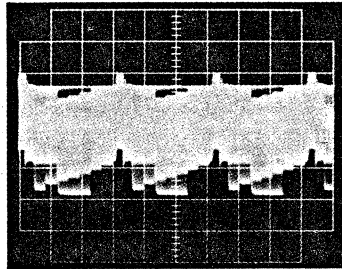


LUMA/CHROMA WAVEFORMS

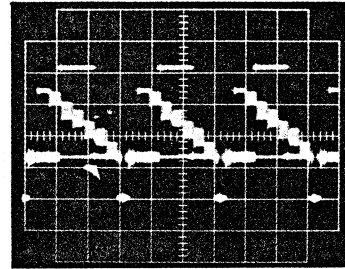
41-A IC203-20 PLAY
0.2V/5 msec. cm



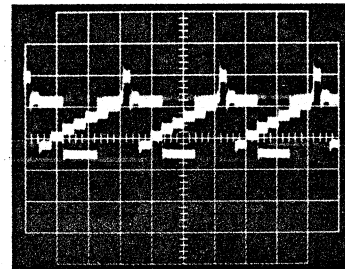
42-A IC206-21 PLAY
0.1V/20 μ sec. cm



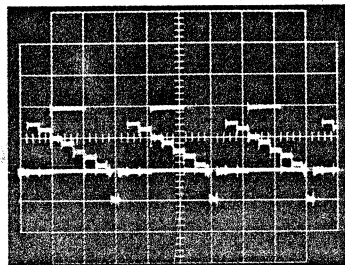
43-A IC203-23 REC
50 mV/20 μ sec. cm



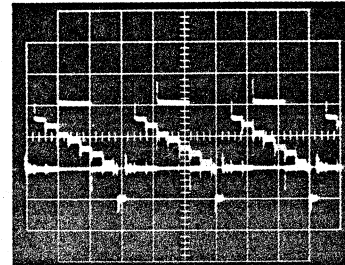
43-B IC203-23 PLAY
50 mV/20 μ sec. cm



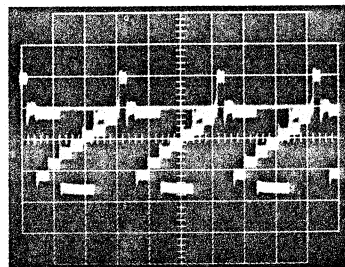
44-A IC203-25 REC
0.1V/20 μ sec. cm



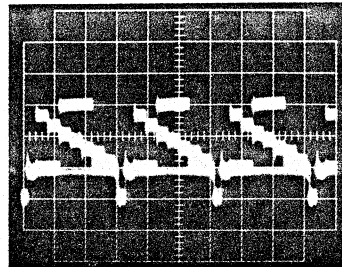
46-A IC203-27 REC
0.1V/20 μ sec. cm



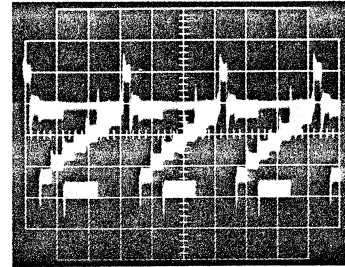
44-B IC203-25 PLAY
50 mV/20 μ sec. cm



45-B IC203-26 PLAY
0.1V/20 μ sec. cm

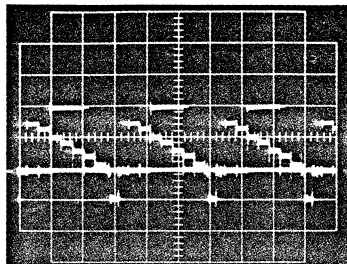


46-B IC203-27 PLAY
50 mV/20 μ sec. cm

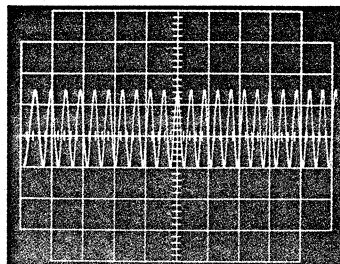


LUMA/CHROMA WAVEFORMS

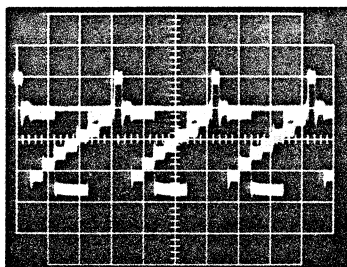
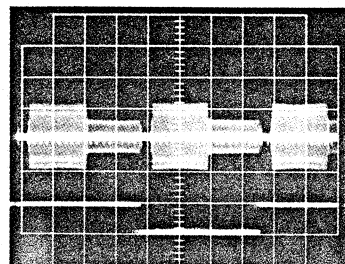
47-A IC203-28 REC
0.1V/20 μ sec. cm



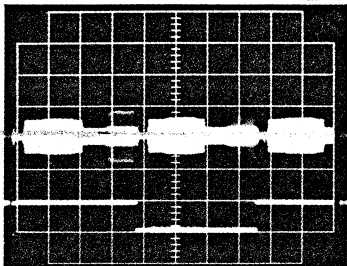
48-A IC204-3 PLAY
0.1V/0.5 μ sec. cm



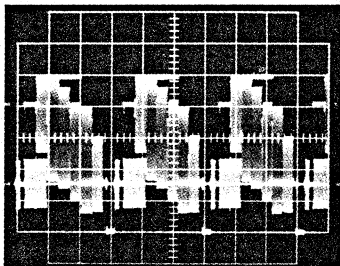
49-A IC204-7 PLAY
0.1V/5 msec. cm



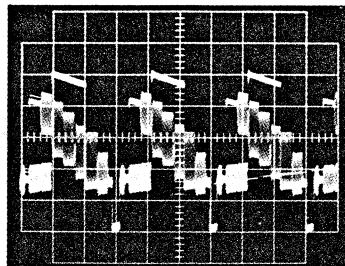
50-A IC204-9 PLAY
0.1V/5 msec. cm



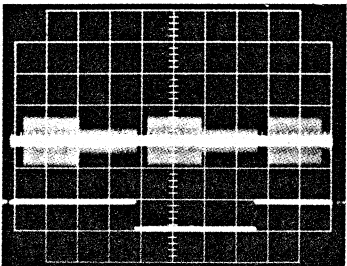
51-A IC204-11 REC
0.2V/20 μ sec. cm



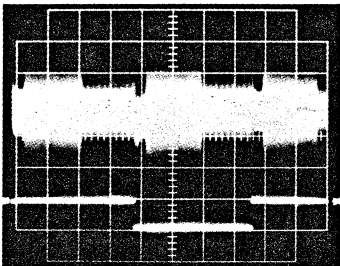
52-A IC204-14 REC
0.2V/20 μ sec. cm



53-A IC204-20 REC
50 mV/5 msec. cm

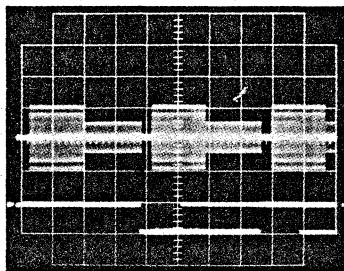


54-A IC204-22 PLAY
50 mV/5 msec. cm

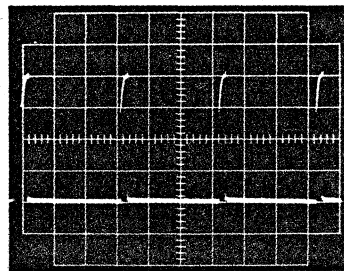


LUMA/CHROMA WAVEFORMS

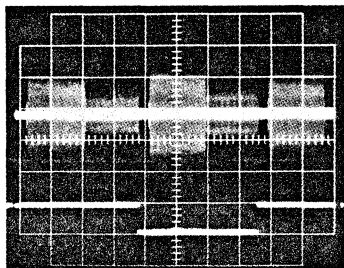
56-A IC204-26 REC
0.1V/5 msec. cm



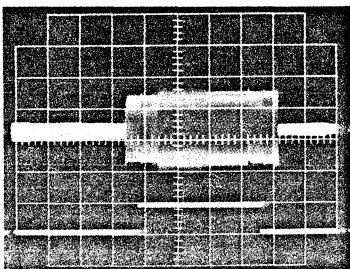
57-A IC204-32 REC/PLAY
1V/20 μ sec. cm



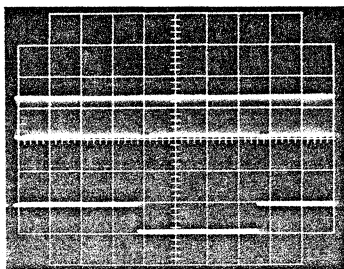
56-B IC204-26 PLAY
50 mV/5 msec. cm



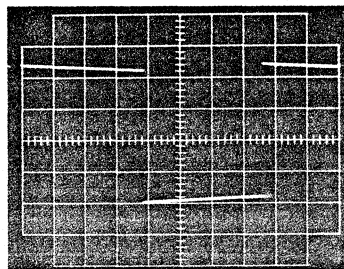
58-A TP201 REC
50 mV/5 msec. cm



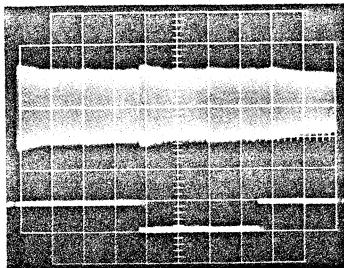
59-A TP203 REC
50 mV/5 msec. cm



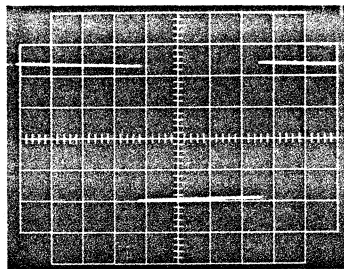
60-A TP204 REC/PLAY
1V/10 msec. cm



59-B TP203 PLAY
50 mV/5 msec. cm

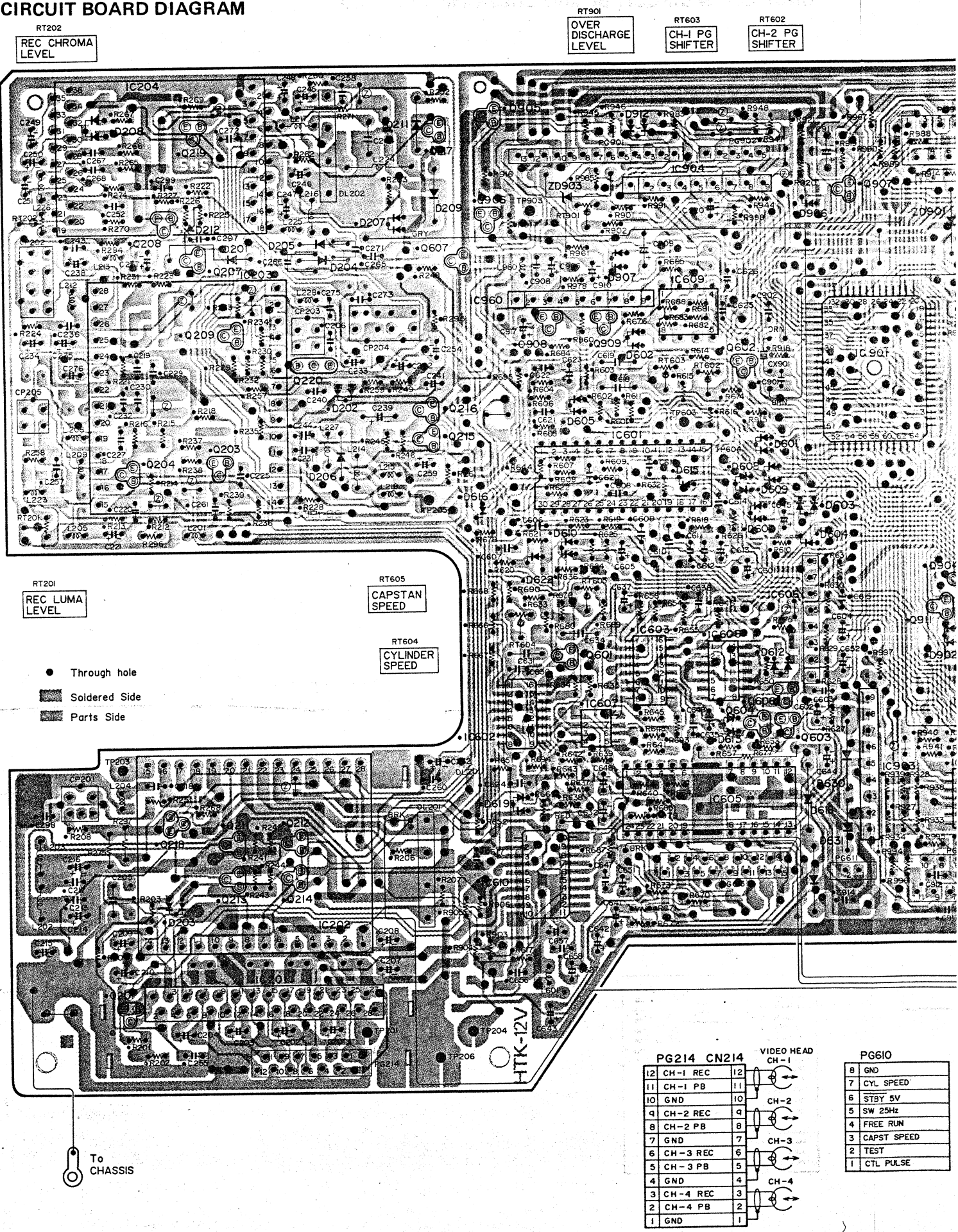


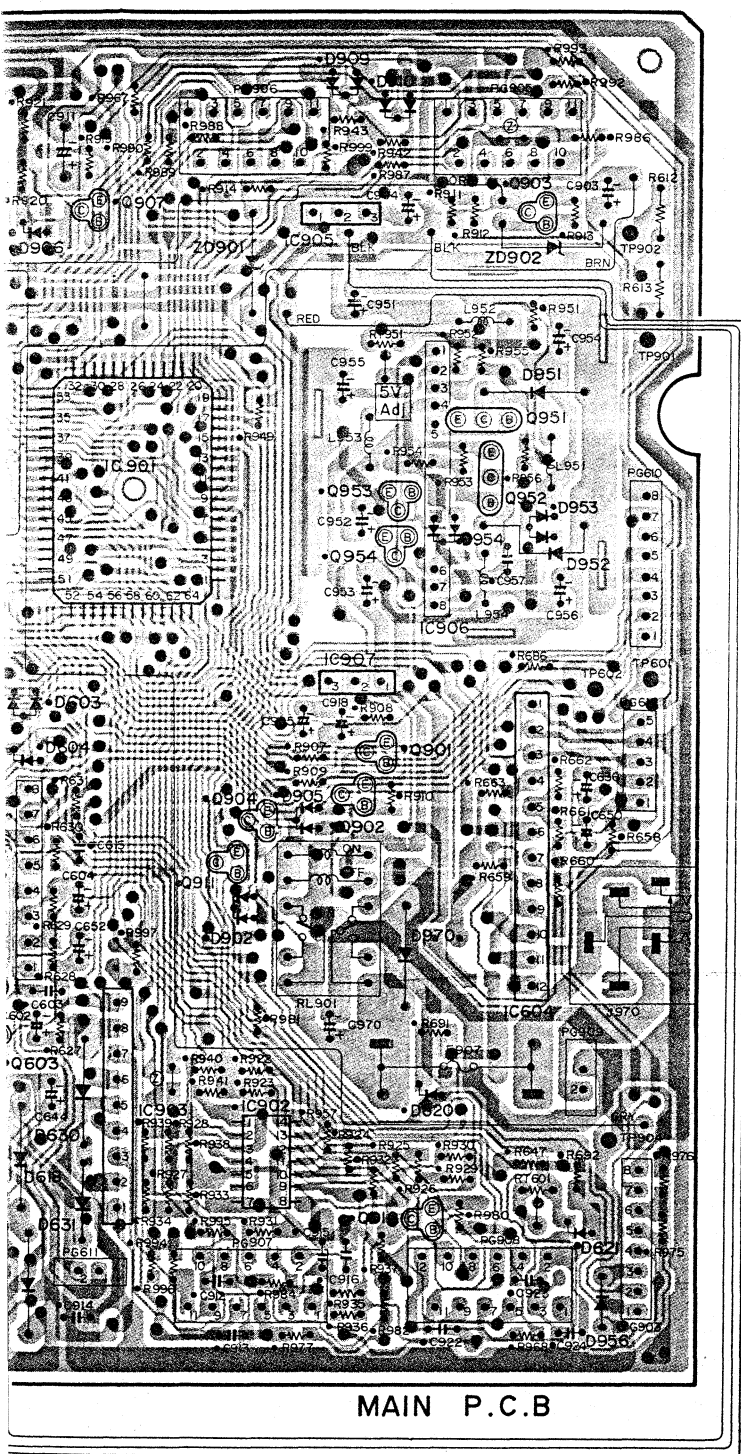
61-A TP205 REC/PLAY
1V/5 msec. cm



MAIN (SYSTEM CONTROL, SWITCHING REGULATOR, SERVO, CYL.-/CAPST.-MOTORS DRIVE, LUMA/CHROMA) CIRCUIT BOARD DIAGRAM

E	IC201 <table> <tr><td>1</td><td>5.0(-1.5)</td><td>15</td><td>0(0)</td></tr> <tr><td>2</td><td>0(4.6)</td><td>16</td><td>2.2(2.0)</td></tr> <tr><td>3</td><td>2.5(1.8)</td><td>17</td><td>0(0)</td></tr> <tr><td>4</td><td>- (-)</td><td>18</td><td>0(0)</td></tr> <tr><td>5</td><td>- (-)</td><td>19</td><td>0(0)</td></tr> <tr><td>6</td><td>2.5(2.0)</td><td>20</td><td>0(0)</td></tr> <tr><td>7</td><td>0(0)</td><td>21</td><td>- (-)</td></tr> <tr><td>8</td><td>0(0)</td><td>22</td><td>2.4(2.0)</td></tr> <tr><td>9</td><td>0(0)</td><td>23</td><td>- (-)</td></tr> <tr><td>10</td><td>0(0)</td><td>24</td><td>0(0)</td></tr> <tr><td>11</td><td>2.5(2.0)</td><td>25</td><td>0(0)</td></tr> <tr><td>12</td><td>0(0)</td><td>26</td><td>0(0)</td></tr> <tr><td>13</td><td>0(0)</td><td>27</td><td>0(0)</td></tr> <tr><td>14</td><td>0(0)</td><td>28</td><td>0(0)</td></tr> </table>	1	5.0(-1.5)	15	0(0)	2	0(4.6)	16	2.2(2.0)	3	2.5(1.8)	17	0(0)	4	- (-)	18	0(0)	5	- (-)	19	0(0)	6	2.5(2.0)	20	0(0)	7	0(0)	21	- (-)	8	0(0)	22	2.4(2.0)	9	0(0)	23	- (-)	10	0(0)	24	0(0)	11	2.5(2.0)	25	0(0)	12	0(0)	26	0(0)	13	0(0)	27	0(0)	14	0(0)	28	0(0)	IC202 <table> <tr><td>1</td><td>- (-)</td><td>15</td><td>1.8(0)</td></tr> <tr><td>2</td><td>3.4(0)</td><td>16</td><td>1.6(0)</td></tr> <tr><td>3</td><td>0(0)</td><td>17</td><td>0(0)</td></tr> <tr><td>4</td><td>0(0)</td><td>18</td><td>8.3(0)</td></tr> <tr><td>5</td><td>0(0)</td><td>19</td><td>0.7(0)</td></tr> <tr><td>6</td><td>3.4(0)</td><td>20</td><td>8.1(0)</td></tr> <tr><td>7</td><td>2.2(2.2)</td><td>21</td><td>0(0)</td></tr> <tr><td>8</td><td>3.4(0)</td><td>22</td><td>0(0)</td></tr> <tr><td>9</td><td>0(0)</td><td>23</td><td>0(0)</td></tr> <tr><td>10</td><td>0(0)</td><td>24</td><td>0(0)</td></tr> <tr><td>11</td><td>0(0)</td><td>25</td><td>0(0)</td></tr> <tr><td>12</td><td>3.4(0)</td><td>26</td><td>0(0)</td></tr> <tr><td>13</td><td>0(3.9)</td><td>27</td><td>0(8.7)</td></tr> <tr><td>14</td><td>0(0)</td><td>28</td><td>0(0)</td></tr> </table>	1	- (-)	15	1.8(0)	2	3.4(0)	16	1.6(0)	3	0(0)	17	0(0)	4	0(0)	18	8.3(0)	5	0(0)	19	0.7(0)	6	3.4(0)	20	8.1(0)	7	2.2(2.2)	21	0(0)	8	3.4(0)	22	0(0)	9	0(0)	23	0(0)	10	0(0)	24	0(0)	11	0(0)	25	0(0)	12	3.4(0)	26	0(0)	13	0(3.9)	27	0(8.7)	14	0(0)	28	0(0)	IC203 <table> <tr><td>1</td><td>2.6(2.1)</td><td>15</td><td>4.7(2.6)</td></tr> <tr><td>2</td><td>3.7(3.7)</td><td>16</td><td>5.1(0)</td></tr> <tr><td>3</td><td>3.0(2.9)</td><td>17</td><td>0(0)</td></tr> <tr><td>4</td><td>1.6(1.4)</td><td>18</td><td>3.3(0)</td></tr> <tr><td>5</td><td>0.5(0.5)</td><td>19</td><td>3.3(0)</td></tr> <tr><td>6</td><td>- (-)</td><td>20</td><td>1.7(1.7)</td></tr> <tr><td>7</td><td>2.9(2.9)</td><td>21</td><td>4.4(2.4)</td></tr> <tr><td>8</td><td>5.0(5.0)</td><td>22</td><td>0(0)</td></tr> <tr><td>9</td><td>3.2(2.9)</td><td>23</td><td>2.9(2.9)</td></tr> <tr><td>10</td><td>0(0)</td><td>24</td><td>2.2(2.1)</td></tr> <tr><td>11</td><td>2.4(2.2)</td><td>25</td><td>3.0(2.8)</td></tr> <tr><td>12</td><td>0(0)</td><td>26</td><td>3.0(3.1)</td></tr> <tr><td>13</td><td>- (-)</td><td>27</td><td>1.3(1.3)</td></tr> <tr><td>14</td><td>0(0)</td><td>28</td><td>1.3(1.3)</td></tr> </table>	1	2.6(2.1)	15	4.7(2.6)	2	3.7(3.7)	16	5.1(0)	3	3.0(2.9)	17	0(0)	4	1.6(1.4)	18	3.3(0)	5	0.5(0.5)	19	3.3(0)	6	- (-)	20	1.7(1.7)	7	2.9(2.9)	21	4.4(2.4)	8	5.0(5.0)	22	0(0)	9	3.2(2.9)	23	2.9(2.9)	10	0(0)	24	2.2(2.1)	11	2.4(2.2)	25	3.0(2.8)	12	0(0)	26	3.0(3.1)	13	- (-)	27	1.3(1.3)	14	0(0)	28	1.3(1.3)	IC204 <table> <tr><td>1</td><td>0(0)</td><td>13</td><td>0(0)</td></tr> <tr><td>2</td><td>2.7(2.7)</td><td>14</td><td>0(0)</td></tr> <tr><td>3</td><td>0(0)</td><td>15</td><td>3.0(3.0)</td></tr> <tr><td>4</td><td>3.9(3.8)</td><td>16</td><td>3.0(3.0)</td></tr> <tr><td>5</td><td>0(0)</td><td>17</td><td>3.5(3.5)</td></tr> <tr><td>6</td><td>2.8(2.8)</td><td>18</td><td>4.0(4.0)</td></tr> <tr><td>7</td><td>0(0)</td><td>19</td><td>0(0)</td></tr> <tr><td>8</td><td>5.0(5.0)</td><td>20</td><td>0(0)</td></tr> <tr><td>9</td><td>0(0)</td><td>21</td><td>2.2(2.2)</td></tr> <tr><td>10</td><td>2.2(2.2)</td><td>22</td><td>2.2(1.3)</td></tr> <tr><td>11</td><td>3.7(3.7)</td><td>23</td><td>0.8(0.8)</td></tr> <tr><td>12</td><td>5.1(0)</td><td>24</td><td>0(0)</td></tr> </table>	1	0(0)	13	0(0)	2	2.7(2.7)	14	0(0)	3	0(0)	15	3.0(3.0)	4	3.9(3.8)	16	3.0(3.0)	5	0(0)	17	3.5(3.5)	6	2.8(2.8)	18	4.0(4.0)	7	0(0)	19	0(0)	8	5.0(5.0)	20	0(0)	9	0(0)	21	2.2(2.2)	10	2.2(2.2)	22	2.2(1.3)	11	3.7(3.7)	23	0.8(0.8)	12	5.1(0)	24	0(0)	IC601 <table> <tr><td>1</td><td>- (-)</td><td>11</td><td>1.3(1.4)</td></tr> <tr><td>2</td><td>2.6(2.6)</td><td>12</td><td>0(0)</td></tr> <tr><td>3</td><td>0(0)</td><td>13</td><td>0(0)</td></tr> <tr><td>4</td><td>2.0(2.0)</td><td>14</td><td>1.3(1.3)</td></tr> <tr><td>5</td><td>2.3(2.3)</td><td>15</td><td>2.2(2.2)</td></tr> <tr><td>6</td><td>2.2(2.2)</td><td>16</td><td>5.3(5.3)</td></tr> <tr><td>7</td><td>0(4.4)</td><td>17</td><td>0.3(0.3)</td></tr> <tr><td>8</td><td>- (-)</td><td>18</td><td>0.4(2.9)</td></tr> <tr><td>9</td><td>0(0)</td><td>19</td><td>0.8(0.8)</td></tr> <tr><td>10</td><td>2.3(2.3)</td><td>20</td><td>0(0)</td></tr> <tr><td></td><td></td><td>30</td><td>- (-)</td></tr> </table>	1	- (-)	11	1.3(1.4)	2	2.6(2.6)	12	0(0)	3	0(0)	13	0(0)	4	2.0(2.0)	14	1.3(1.3)	5	2.3(2.3)	15	2.2(2.2)	6	2.2(2.2)	16	5.3(5.3)	7	0(4.4)	17	0.3(0.3)	8	- (-)	18	0.4(2.9)	9	0(0)	19	0.8(0.8)	10	2.3(2.3)	20	0(0)			30	- (-)
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MAIN P.C.B

RT601

TRACKING
PRESET

CTL HEAD



8	GND
7	CYL SPEED
6	STBY 5V
5	SW 25Hz
4	FREE RUN
3	CAPST SPEED
2	TEST
1	CTL PULSE

ADJUSTMENT
TERMINAL

PG610	PG611	CN611
2	CTL PULSE	2
1	GND	1

PG612
5 FORWARD
4 GND
3 REWIND
2 CAPST FG
1 GND

To
CAPST
MOTOR
CN612

PG613

1	V
2	W
3	U
4	HALL BIAS
5	TACH BIAS
6	U -
7	W -
8	V -
9	HALL BIAS
10	V +
11	W +
12	U +
13	TACH BIAS
14	CYL. FG
15	CYL. FG

To
CYL.
MOTOR
CN613

PG907

11	M. STATE 2
10	M. STATE 1
9	M. STATE 0
8	LOAD
7	UNLOAD
6	REEL PULSE
5	CASSETTE SW
4	TAB
3	FWD END
2	REW END
1	END LAMP

To
AUDIO
(TROUBLE
SENSOR)
CN107

PG908

1	AUDIO
2	GND (AUDIO)
3	VTR REC SW
4	REC LED
5	PB
6	AUDIO MUTE
7	MIC CUT
8	OSC ON
9	GND
10	DEW
11	STBY 5V
12	TRACKING

To
AUDIO
(AUDIO)
CN408

PG909

1	GND
2	12V

To
BATTERY
CN909

PG901

1	INHIBIT
2	CAMERA/VTR
3	TIME LAPSE
4	REC/LOW BATT.
5	PB 5V
6	STANDBY
7	VTR REC SW
8	STBY 5V
9	GND
10	12V
11	VIDEO (V - C)
12	GND
13	VIDEO (C - V)

To
REGULATOR
CN501

PG902

1	STBY 5V
2	BATT EMPTY
3	BATT MID
4	BATT FULL
5	REVIEW

To
CAMERA SW
CN1602

PG903

8	VIDEO
7	SECAM
6	AUDIO
5	AUDIO
4	GND (AUDIO)
3	12V
2	GND
1	VIDEO

To
A/V CONNECTOR

PG905

1	5V
2	POWER SW
3	GND
4	CAMERA/VCR
5	—
6	1/2 REEL PULSE
7	LCD B+
8	MEMORY STOP
9	COUNTER 0
10	COUNTER 1
11	—

To
FUNCTION
SW
CN005

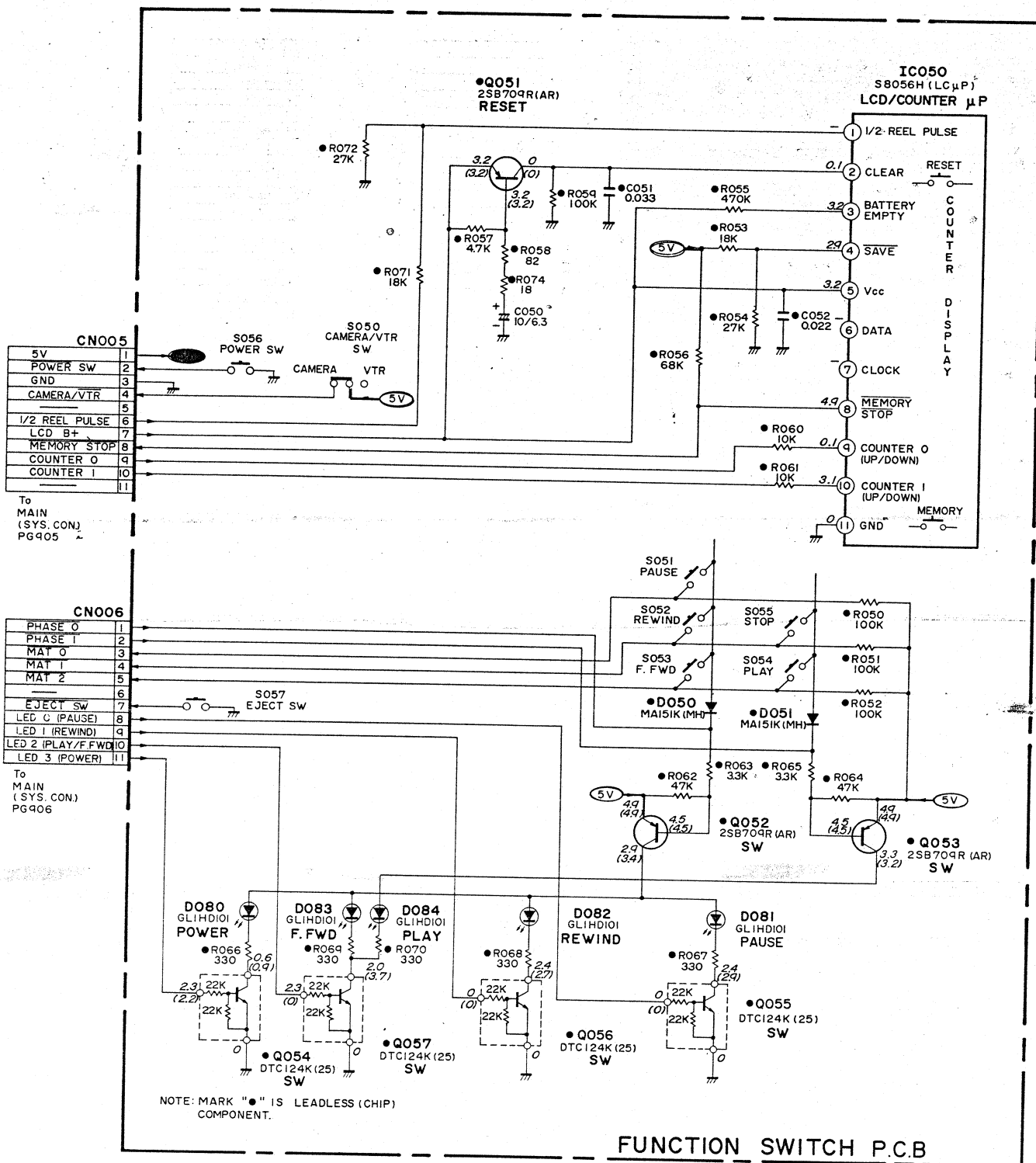
PG906

1	PHASE 0
2	PHASE 1
3	MAT 0
4	MAT 1
5	MAT 2
6	—
7	EJECT SW
8	LED 0 (PAUSE)
9	LED 1 (REWIND)
10	LED 2 (PLAY/FWD)
11	LED 3 (POWER)

To
FUNCTION
SW
CN006NOTE: MARK "⊙" IS LEADLESS JUMPER.
MARK "•" IS LEADLESS(CHIP) COMPONENT.

FUNCTION SW SCHEMATIC DIAGRAM

FU



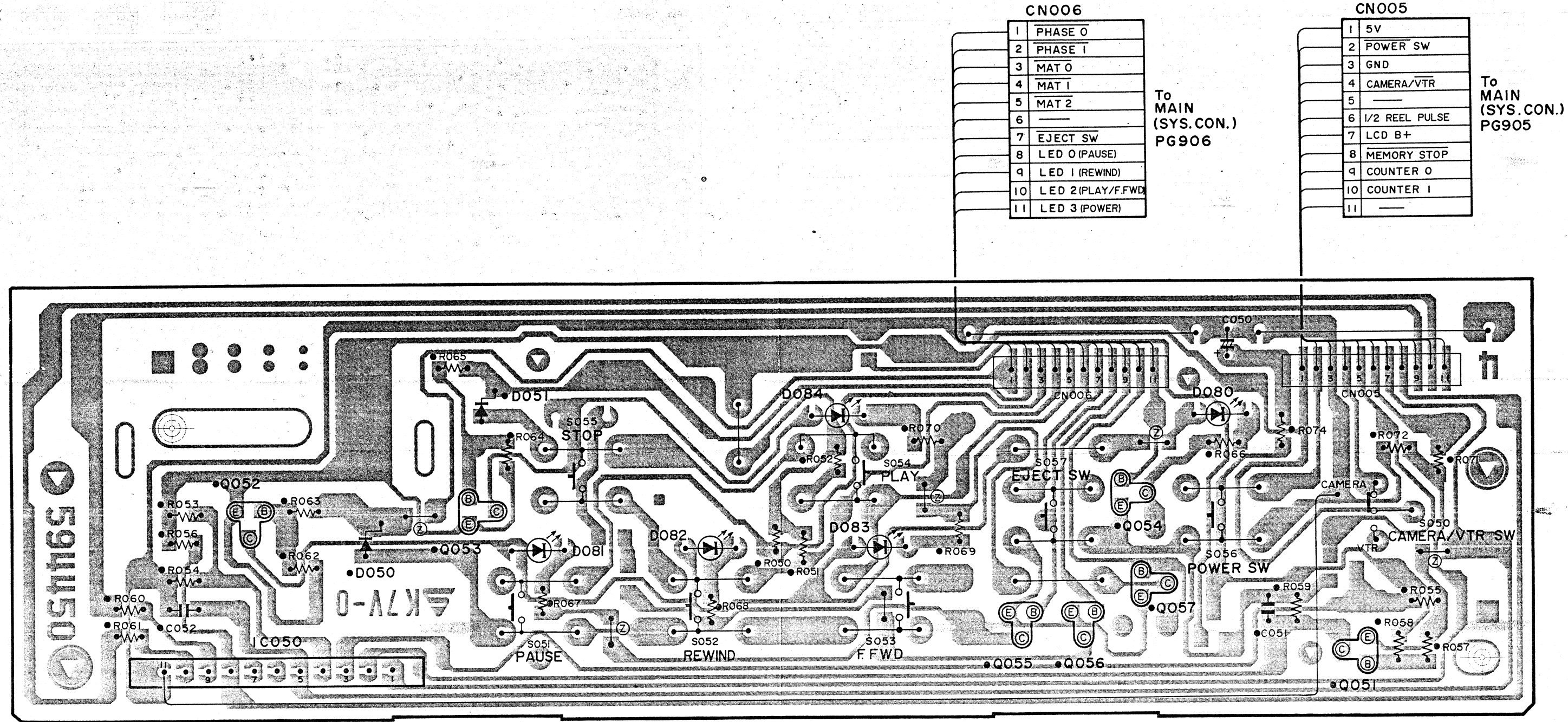
1

2

3

4

FUNCTION SW CIRCUIT BOARD DIAGRAM



FUNCTION SW P.C.B

※ NOTE: MARK "Z" IS LEADLESS JUMPER.
MARK "•" IS LEADLESS(CHIP)
COMPONENT.

SCHEMATIC	PAGE
PREAMP	108
PRE PROCESS	109
VIDEO PROCESS	185
DEFLECTION	190
REGULATOR	196
CAMERA SW	204
ELECTRONIC VIEWFINDER	206
MIC JACK	211
AUTO FOCUS	212
SYSTEM CONTROL	217
SERVO	219
CYL./CAPST.-MOTORS DRIVE	227
SWITCHING REGULATOR	228
LUMA/CHROMA	229
FUNCTION SW	242
AUDIO	248
TROUBLE SENSOR	246

Q051		
B	3.2(3.2)	
C	0 (0)	
E	3.2(3.2)	

Q052		
B	4.5(4.5)	
C	2.9(3.4)	
E	4.9(4.9)	

Q053		
B	4.5(4.5)	
C	3.3(3.2)	
E	4.9(4.9)	

Q054		
B	2.3(2.2)	
C	0.6(0.9)	
E	0	

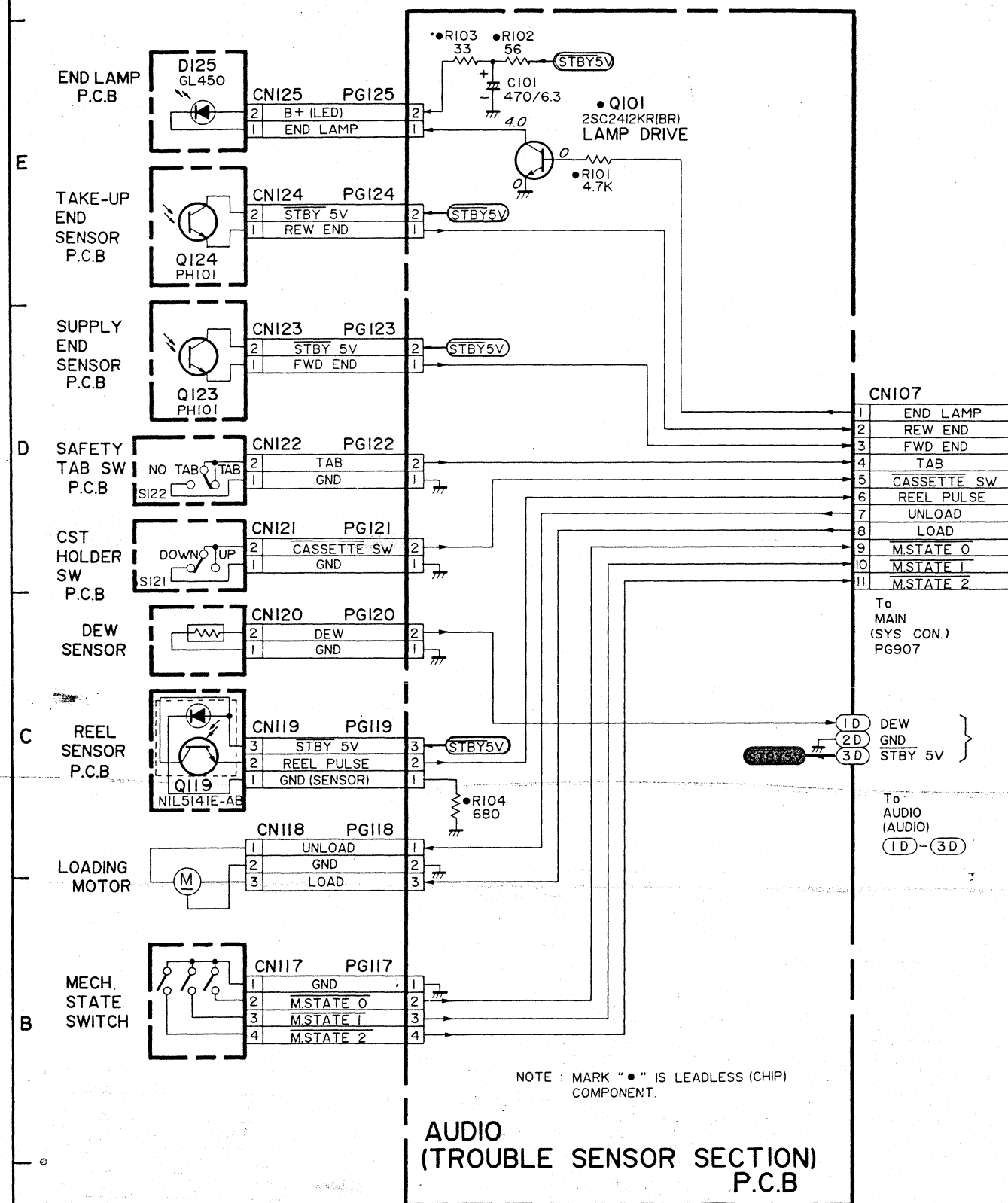
IC050		
1	-	
2	0.1	
3	3.2	
4	2.9	
5	3.2	
6	-	
7	-	
8	4.9	
9	0.1	
10	3.1	
11	0	

Q055		
B	0 (0)	
C	2.4(2.9)	
E	0	

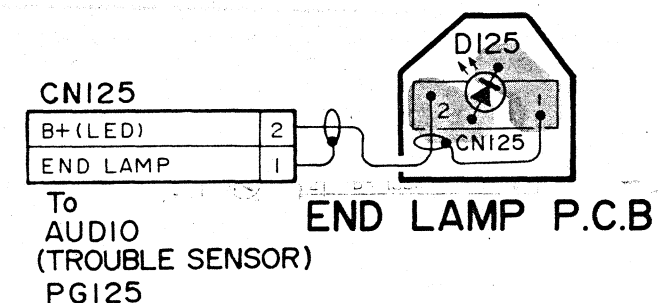
Q056		
B	0 (0)	
C	2.4(2.7)	
E	0	

Q057		
B	2.3 (0)	
C	2.0(3.7)	
E	0	

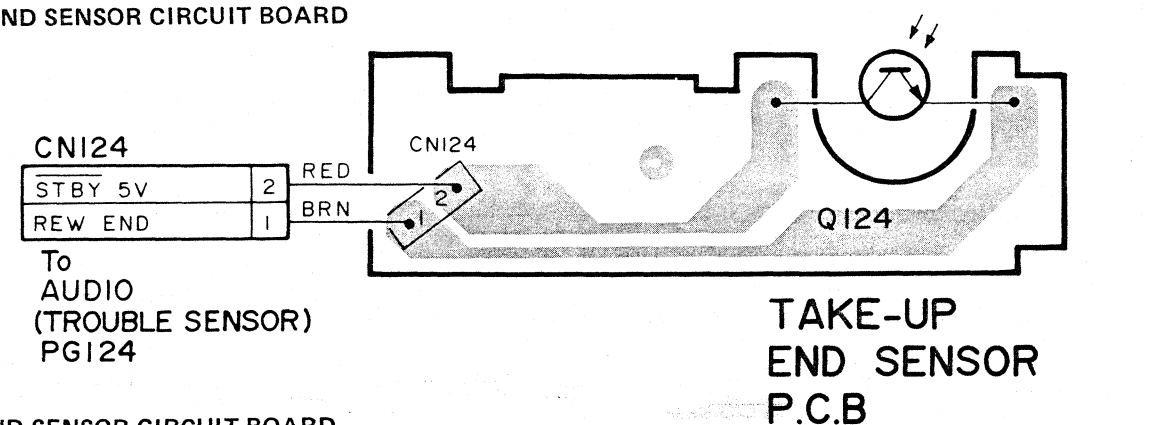
AUDIO (TROUBLE SENSOR) SCHEMATIC DIAGRAM



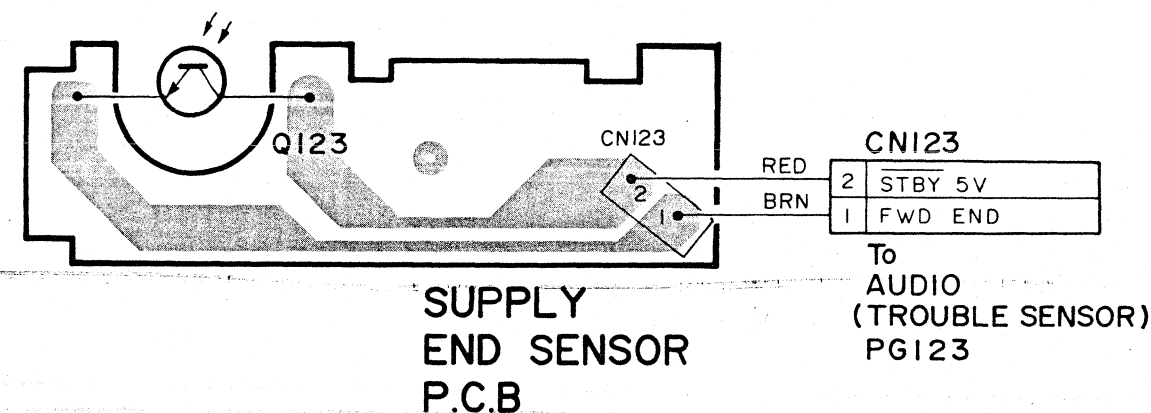
• END LAMP CIRCUIT BOARD



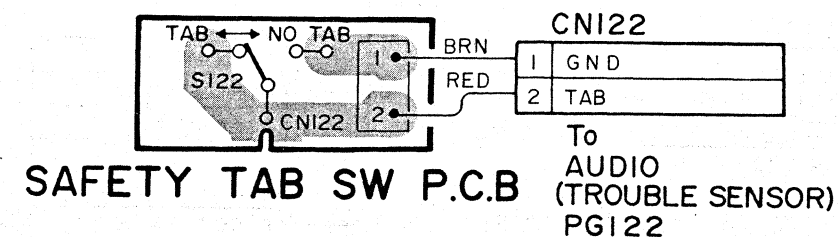
• TAKE-UP END SENSOR CIRCUIT BOARD



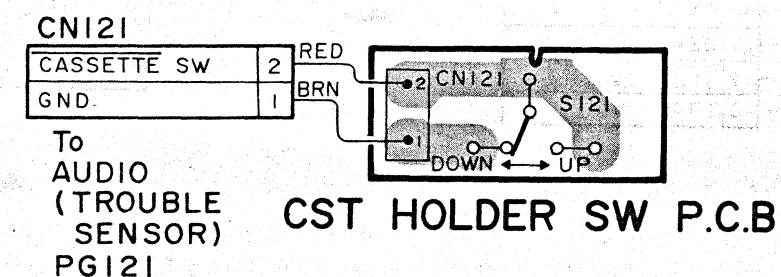
• SUPPLY END SENSOR CIRCUIT BOARD



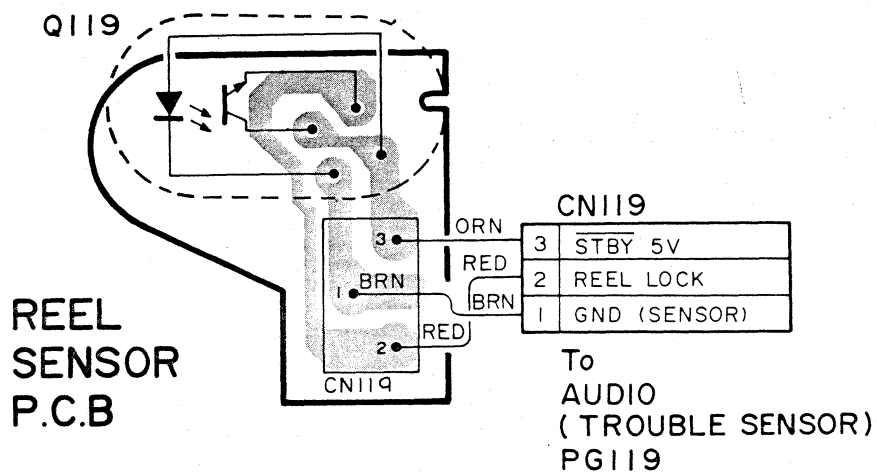
• SAFETY TAB SW CIRCUIT BOARD



• CASSETTE HOLDER SW CIRCUIT BOARD



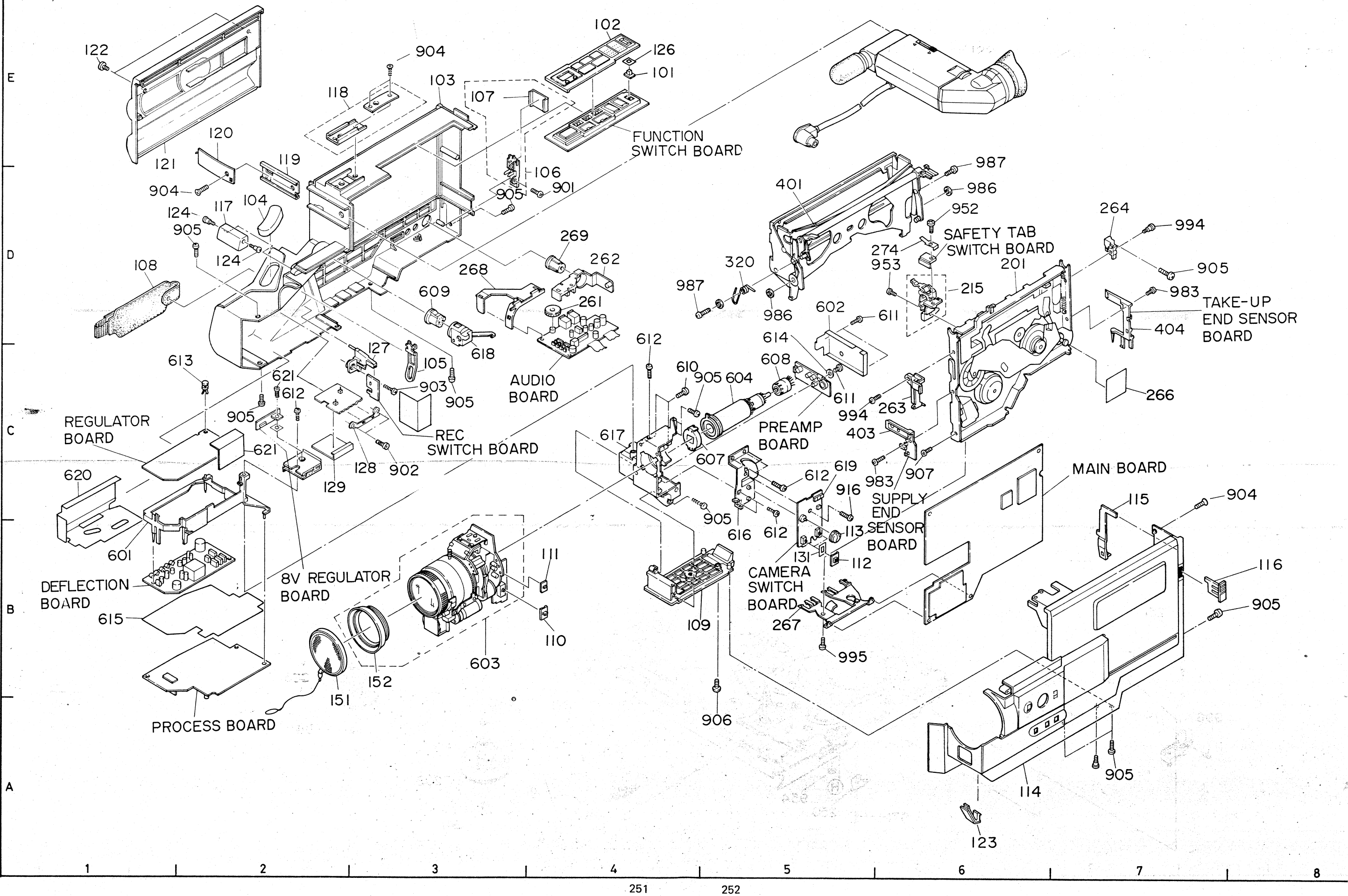
• REES SENSOR CIRCUIT BOARD



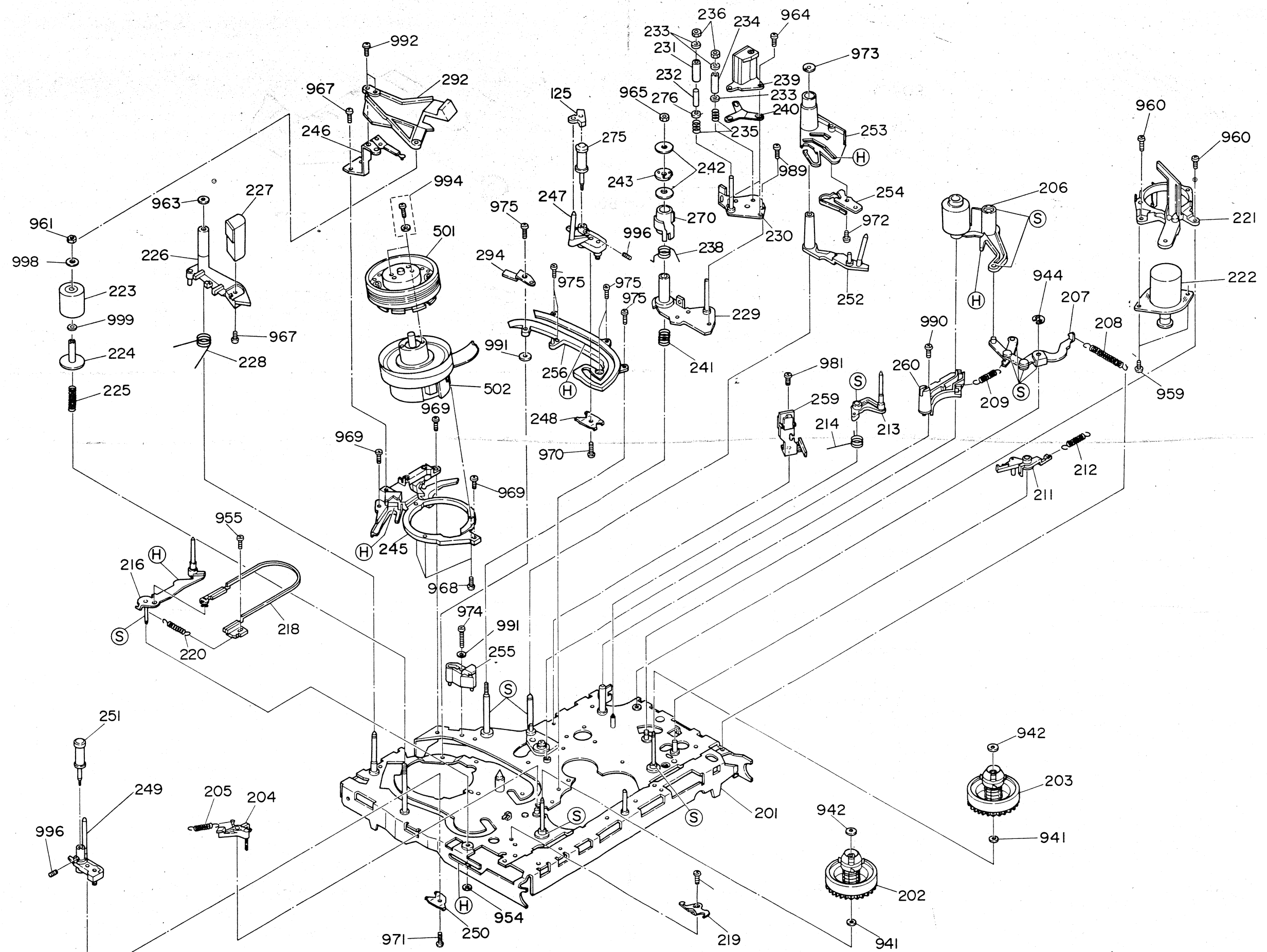
SCHEMATIC	PAGE	SCHEMATIC	PAGE
PREAMP	168	SYSTEM CONTROL	217
PRE PROCESS	169	SERVO	219
VIDEO PROCESS	185	CYL./CAPST.-MOTORS DRIVE	227
DEFLECTION	190	SWITCHING REGULATOR	228
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ELECTRONIC VIEWFINDER	206	AUDIO	248
MIC JACK	211	TROUBLE SENSOR	245
AUTO FOCUS	212		

EXPLODED VIEWS

CABINET SECTION

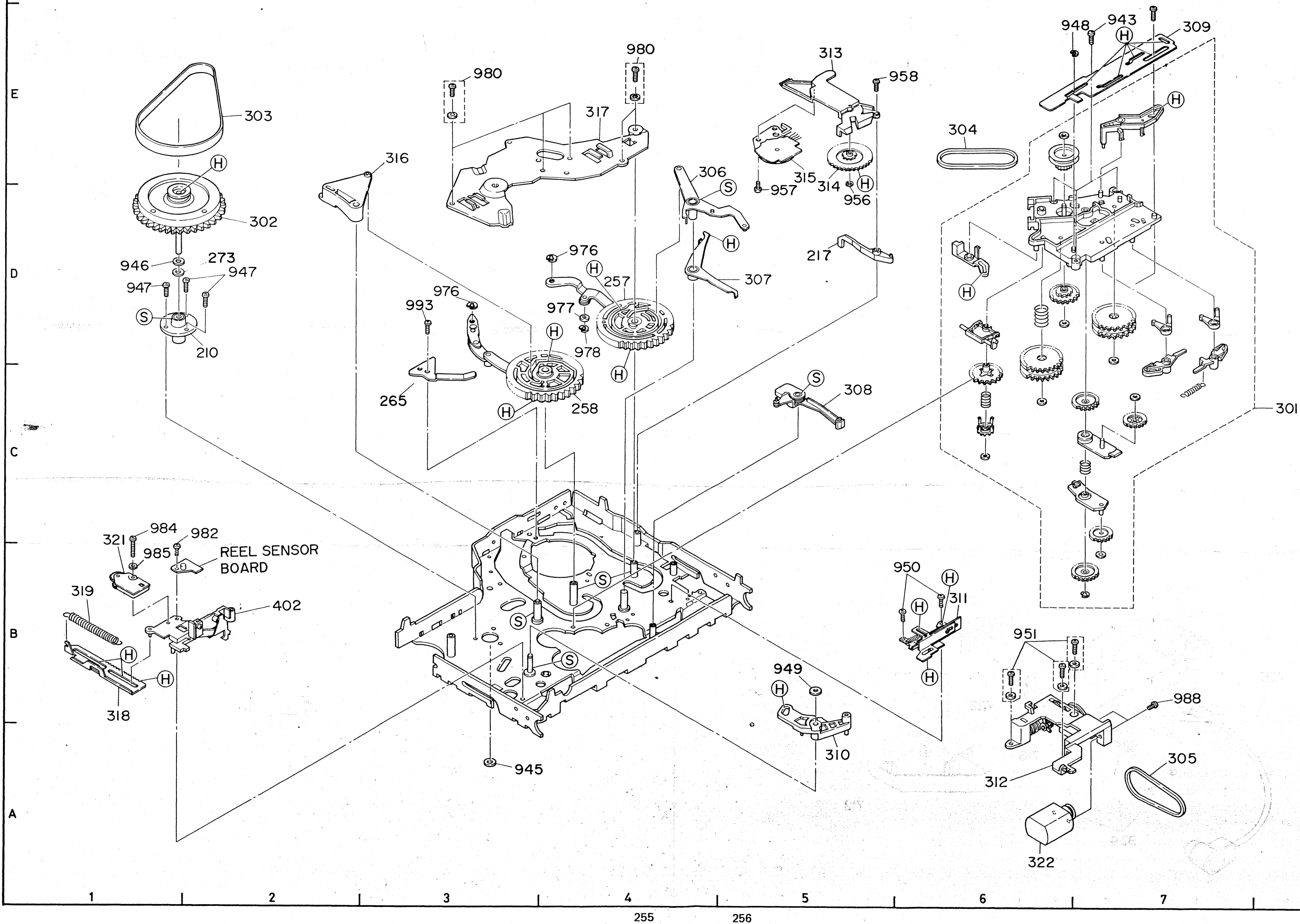


CHASSIS (UPPER) SECTION

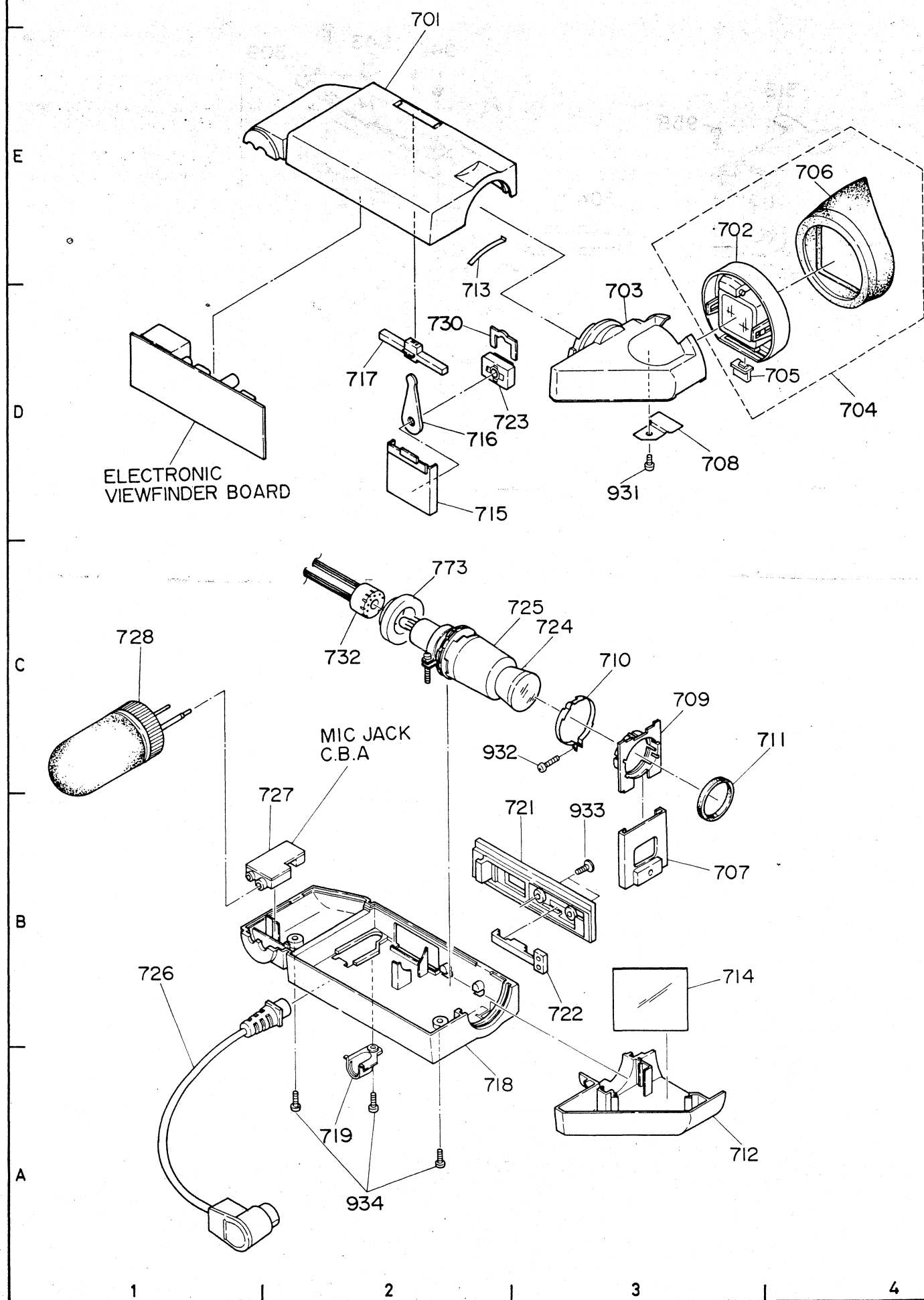


1 2 3 4 5 6 7 8

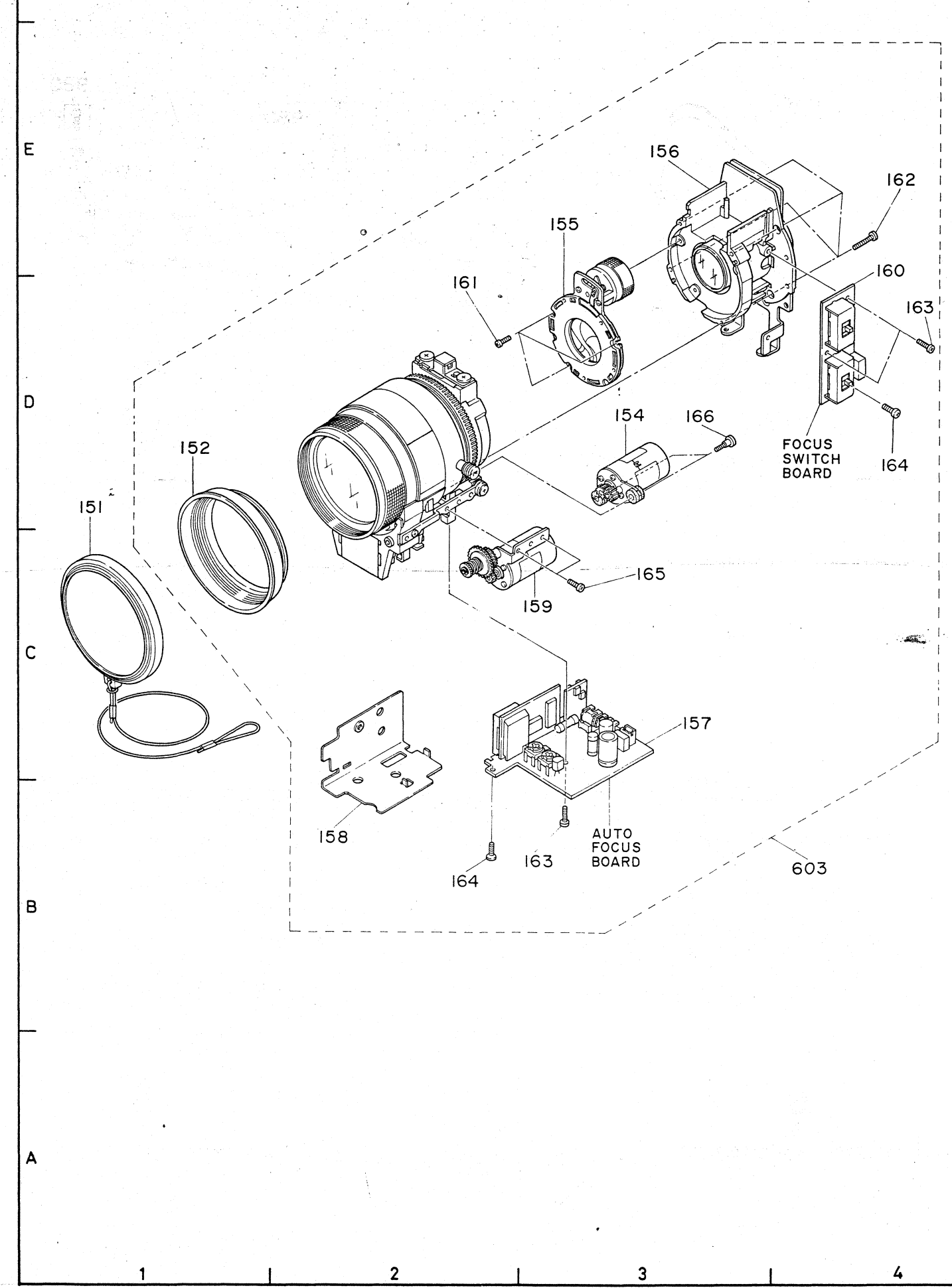
CHASSIS (LOWER) SECTION



ELECTRONIC VIEW FINDER SECTION



LENS SECTION



LUBRICATION

Lubrication points are shown in the exploded view diagrams by marks (S, H)

Lubricants shown in the diagram are as follows.

(S) Sonic slider oil (# 1600)

(H) Hitazol (MO-138)

REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS			C 601	0256160	ELECTROLYTIC 47UF, 6.3V
C 050	0256387	TANTALUM ELECTROLYTIC 10UF, 6.3V	C 603	0201072	CERAMIC CHIP 0.047UF+80-20X
C 051	0201068	CAPACITOR 0.033UF+80-20X 25V CERAMIC CHIP	C 605	0256471	TANTALUM ELECTROLYTIC 10UF 6.3V
C 204	0256685	ELECTROLYTIC 1UF, 50V	C 606	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 213	0201065	CERAMIC CHIP 0.022UF+-10X 25V	C 607	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 214	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	C 608	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 216	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	C 609	0201100	CERAMIC CHIP 0.033UF+-10X
C 217	0201065	CERAMIC CHIP 0.022UF+-10X 25V	C 611	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 218	0201037	CERAMIC CHIP 330PF+-5X 50V	C 612	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 219	0201029	CERAMIC CHIP 68PF+-5X 50V	C 614	0201028	CERAMIC CHIP 56PF+-5X 50V
C 220	0201065	CERAMIC CHIP 0.022UF+-10X 25V	C 615	0201035	CERAMIC CHIP 220PF+-5X 50V
C 221	0256160	ELECTROLYTIC 47UF, 6.3V	C 616	0201031	CERAMIC CHIP 100PF+-5X 50V
C 225	0201007	CERAMIC CHIP 0.01UF+-20X 50V	C 617	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 227	0201030	CERAMIC CHIP 82PF+-5X 50V	C 620	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 229	0201031	CERAMIC CHIP 100PF+-5X 50V	C 621	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 230	0201033	CERAMIC CHIP 150PF+-5X 50V	C 622	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 232	0201041	CERAMIC CHIP 680PF+-5X 50V	C 623	0256475	TANTALUM 4.7UF+-30X 10V
C 234	0256160	ELECTROLYTIC 47UF, 6.3V	C 624	0201057	CERAMIC CHIP 0.0022UF+-10X 50V
C 236	0201030	CERAMIC CHIP 82PF+-5X 50V	C 625	0201057	CERAMIC CHIP 0.0022UF+-10X 50V
C 243	0201032	CERAMIC CHIP 120PF+-5X 50V	C 626	0201057	CERAMIC CHIP 0.0022UF+-10X 50V
C 244	0201023	CERAMIC CHIP 18PF+-5X 50V	C 630	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 246	0256159	ELECTROLYTIC 100UF 6.3V	C 635	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 252	0201031	CERAMIC CHIP 100PF+-5X 50V	C 638	0201057	CERAMIC CHIP 0.0022UF+-10X 50V
C 255	0201065	CERAMIC CHIP 0.022UF+-10X 25V	C 647	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 258	0201100	CERAMIC CHIP 0.033UF+-10X	C 649	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 259	0256159	ELECTROLYTIC 100UF 6.3V	C 652	0256160	ELECTROLYTIC 47UF, 6.3V
C 261	0201081	CERAMIC CHIP 8PF+-0.5X 50V	C 656	0201007	CERAMIC CHIP 0.01UF+-20X 50V
C 265	0201034	CERAMIC CHIP 180PF+-5X	C 657	0256159	ELECTROLYTIC 100UF 6.3V
C 266	0201035	CERAMIC CHIP 200PF+-5X 50V	C 658	0201065	CERAMIC CHIP 0.022UF+-10X 50V
C 267	0201041	CERAMIC CHIP 680PF+-5X 50V	C 901	0201025	CERAMIC CHIP 33PF+-5X
C 268	0201007	CERAMIC CHIP 0.01UF+-20X 50V	C 902	0201025	CERAMIC CHIP 33PF+-5X
C 271	0201007	CERAMIC CHIP 0.01UF+-20X 50V	C 908	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 272	0201007	CERAMIC CHIP 0.01UF+-20X 50V	C 911	0256490	ELECTROLYTIC 0.22F 5.5V
C 273	0201028	CERAMIC CHIP 56PF+-5X 50V	C 912	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 297	0201001	CERAMIC CHIP 22PF+-5X 50V	C 913	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 298	0201022	CERAMIC CHIP 15PF+-5X 50V	C 914	0201065	CERAMIC CHIP 0.022UF+-10X 25V
C 401	0201054	CERAMIC CHIP 0.001UF+-10X 50V	C 915	0201007	CERAMIC CHIP 0.01UF+80-20X
C 402	0256160	ELECTROLYTIC 47UF, 6.3V	C 916	0201007	CERAMIC CHIP 0.01UF+80-20X
C 405	0201007	CERAMIC CHIP 0.01UF+-20X 50V	C 952	0256158	CAPACITOR ELECTROLYTIC 47UF 16V
C 410	0201061	CERAMIC CHIP 0.0047UF+-10X 50V	C 953	0256158	CAPACITOR ELECTROLYTIC 47UF 16V
C 411	0201061	CERAMIC CHIP 0.0047UF+-10X 50V	C 954	0256159	ELECTROLYTIC 100UF 6.3V
C 417	0201100	CERAMIC CHIP 0.033UF+-20X 50V	C 956	0256158	ELECTROLYTIC 47UF 16V
C 419	0256159	ELECTROLYTIC 100UF 6.3V	C1001	0201008	CERAMIC CHIP 0.015UF+-10X
C 420	0256159	ELECTROLYTIC 100UF 6.3V	C1002	0256158	CAPACITOR 47UF 16V ELECTROLYTIC
C 422	0256159	ELECTROLYTIC 100UF 6.3V	C1005	0256156	CAPACITOR ELECTROLYTIC 22UF 16V
C 423	0256160	ELECTROLYTIC 47UF, 6.3V	C1006	0256154	CAPACITOR ELECTROLYTIC 4.7UF 25V
C 424	0201049	CERAMIC CHIP 390PF+-10X 50V	C1007	0201017	CAPACITOR 7PF+-0.5PF
C 426	0256160	ELECTROLYTIC 47UF, 6.3V	C1008	0201015	CERAMIC CHIP 5PF+-0.25PF 50V
C 428	0201047	CERAMIC CHIP 220PF +- 10X 50V	C1009	0256158	CAPACITOR 47UF 16V ELECTROLYTIC
C 429	0201061	CERAMIC CHIP 0.0047UF+-10X 50V	C1010	0256158	CAPACITOR 47UF 16V ELECTROLYTIC
C 430	0256160	ELECTROLYTIC 47UF, 6.3V	C1011	0201989	CERAMIC CHIP 0.1UF+-20X 50V
C 431	0201008	CERAMIC CHIP 0.015UF+-10X	C1102	0256156	CAPACITOR ELECTROLYTIC 22UF 16V
C 432	0201061	CERAMIC CHIP 0.0047UF+-10X 50V	C1107	0201001	CERAMIC CHIP 22PF+-5X 50V
C 434	0201059	CERAMIC CHIP 0.0033UF+-10X 50V	C1110	0201069	CERAMIC CHIP 0.1UF+80-20X 25V
			C1111	0201007	CERAMIC CHIP 0.01UF+-20X 50V

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS			C1511	0256155	CAPACITOR ELECTROLYTIC 10UF 16V
C1112	0201007	CERAMIC CHIP 0.01UF+-20% 50V	C1513	0201007	CERAMIC CHIP 0.01UF+-20% 50V
C1113	0201027	CERAMIC CHIP 47PF +-5% 50V	C1515	0256159	ELECTROLYTIC 100UF 6.3V
C1115	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	C1520	0256155	CAPACITOR ELECTROLYTIC 10UF 16V
C1116	0201031	CERAMIC CHIP 100PF+-5% 50V	C1523	0256155	CAPACITOR ELECTROLYTIC 10UF 16V
C1118	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	C1524	0256689	ELECTROLYTIC 10UF, 6.3V
C1119	0201072	CERAMIC CHIP 0.047UF+80-20%	C1526	0201036	CERAMIC CHIP 270PF+-5% 50V
C1121	0256160	ELECTROLYTIC 47UF, 6.3V	C1802	0201069	CERAMIC CHIP 0.1UF+80-20% 25V
C1122	0256160	ELECTROLYTIC 47UF, 6.3V	C1808	0201007	CERAMIC CHIP 0.01UF+-20% 50V
C1124	0201026	CERAMIC CHIP 39PF+-5% 50V	C1811	0201065	CERAMIC CHIP 0.022UF+-10% 25V
C1125	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	C1814	0256360	TANTALUM ELECTROLYTIC 0.1UF 35V
C1126	0201007	CERAMIC CHIP 0.01UF+-20% 50V	C1817	0256363	TANTALUM ELECTROLYTIC 0.33UF, 35V
C1127	0201007	CERAMIC CHIP 0.01UF+-20% 50V	C1819	0201040	CAPACITOR 560PF+-5%
C1129	0256160	ELECTROLYTIC 47UF, 6.3V	C1820	0201008	CERAMIC CHIP 0.015UF+-10%
C1131	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	C1821	0201989	CERAMIC CHIP 0.1UF+-20% 50V
C1135	0256160	ELECTROLYTIC 47UF, 6.3V	C1822	0201039	CERAMIC CHIP 470PF+-5% 50V
C1141	0201023	CERAMIC CHIP 18PF+-5% 50V	C1827	0201989	CERAMIC CHIP 0.1UF+-20% 50V
C1142	0201007	CERAMIC CHIP 0.01UF+-20% 50V	C1831	0201061	CERAMIC CHIP 0.0047UF+-10% 50V
C1143	0256159	ELECTROLYTIC 100UF 6.3V	C1832	0201062	CERAMIC CHIP 0.0068UF+-10% 50V
C1144	0201007	CERAMIC CHIP 0.01UF+-20% 50V	C1833	0201062	CERAMIC CHIP 0.0068UF+-10% 50V
C1145	0201030	CERAMIC CHIP 82PF+-5% 50V	C1834	0201062	CERAMIC CHIP 0.0068UF+-10% 50V
C1146	0201027	CERAMIC CHIP 47UF+-5% 50V	C1835	0201039	CERAMIC CHIP 470PF+-5% 50V
C1162	0201072	CERAMIC CHIP 0.047UF+80-20%	CT1001	5058492	TRIMMER CAPACITOR
C1165	0201026	CAPACITOR 39PF+-5%	CT1102	5058482	TRIMMER 90PF
C1166	0256689	ELECTROLYTIC 10UF, 6.3V	RESISTORS		
C1170	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	R 050	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
C1172	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	R 051	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
C1180	0201035	CERAMIC CHIP 220PF+-5% 50V	R 052	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
C1183	0201037	CERAMIC CHIP 330PF+-5% 50V	R 053	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
C1305	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	R 054	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
C1306	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 055	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W
C1307	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 056	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
C1310	0201038	CERAMIC CHIP 390PF+-5%	R 057	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
C1312	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 058	0103830	CHIP RESISTOR 82OHM+-5% 0.1W
C1314	0201054	CERAMIC CHIP 1000PF+-10% 50V	R 059	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
C1315	0201072	CERAMIC CHIP 0.047UF+80-20%	R 060	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C1316	0201035	CERAMIC CHIP 220PF+-5% 50V	R 061	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C1317	0256151	CAPACITOR ELECTROLYTIC 1UF 50V	R 062	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
C1318	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 063	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
C1320	0201072	CERAMIC CHIP 0.047UF+80-20%	R 064	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
C1331	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	R 065	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
C1332	0256155	CAPACITOR ELECTROLYTIC 10UF 16V	R 066	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
C1334	0201069	CERAMIC CHIP 0.1UF+80-20% 25V	R 067	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
C1337	0201065	CERAMIC CHIP 0.022UF+-10% 25V	R 068	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
C1338	0256194	CAPACITOR 470UF10V ELECTROLYTIC	R 069	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
C1501	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 070	0103837	CHIP RESISTOR 330OHM+-5% 0.1W
C1502	0201007	CERAMIC CHIP 0.01UF+-20% 50V	R 071	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
C1504	0256151	CAPACITOR ELECTROLYTIC 1UF 50V	R 072	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
C1505	0256151	CAPACITOR ELECTROLYTIC 1UF 50V	R 101	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
C1506	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 102	0103828	CHIP RESISTOR 560HM+-5% 0.1W
C1507	0256151	CAPACITOR ELECTROLYTIC 1UF 50V	R 103	0103825	CHIP RESISTOR 330HM+-5% 0.1W
C1508	0256151	CAPACITOR ELECTROLYTIC 1UF 50V	R 104	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
C1509	0256158	CAPACITOR 47UF 16V ELECTROLYTIC	R 201	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
C1510	0256156	CAPACITOR ELECTROLYTIC 22UF 16V	R 202	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS					
R 203	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 401	0103819	CHIP RESISTOR 100HM+-5% 0.1W
R 204	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 402	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 206	0103838	CHIP RESISTOR 3900HM+-5% 0.1W	R 404	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 207	0103838	CHIP RESISTOR 3900HM+-5% 0.1W	R 405	0103837	CHIP RESISTOR 3300HM+-5% 0.1W
R 208	0103853	CHIP RESISTOR 220OHM+-5% 0.1W	R 406	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 212	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 407	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 213	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 408	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 214	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 409	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 215	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 410	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 216	0103837	CHIP RESISTOR 3300HM+-5% 0.1W	R 411	0103831	CHIP RESISTOR 1000HM+-5% 0.1W
R 221	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 412	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 222	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	R 413	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R 223	0103840	CHIP RESISTOR 5600HM+-5% 0.1W	R 414	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 224	0103842	CHIP RESISTOR 8200HM+-5% 0.1W	R 415	0103841	CHIP RESISTOR 6800HM+-5% 0.1W
R 225	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 416	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 226	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	R 417	0103876	CHIP RESISTOR 560KOHM+-5% 0.1W
R 227	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 418	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 228	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W	R 419	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 229	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W	R 420	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 230	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W	R 421	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 231	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 422	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 232	0103841	CHIP RESISTOR 6800HM+-5% 0.1W	R 423	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 233	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 424	0103835	CHIP RESISTOR 2200HM+-5% 0.1W
R 234	0103837	CHIP RESISTOR 3300HM+-5% 0.1W	R 425	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 235	0103837	CHIP RESISTOR 3300HM+-5% 0.1W	R 426	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 236	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R 427	0170474	FUSE RESISTOR 10 OHM+-5% 1/4W
R 237	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 428	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 238	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 430	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W
R 239	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 431	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 241	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R 432	0103837	CHIP RESISTOR 3300HM+-5% 0.1W
R 242	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 433	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 243	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R 434	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 244	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 435	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 245	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R 601	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 246	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R 602	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R 248	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	R 603	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 249	0103868	CHIP RESISTOR 120KOHM+-5% 0.1W	R 604	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 251	0103837	CHIP RESISTOR 3300HM+-5% 0.1W	R 605	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W
R 252	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 606	0103878	CHIP RESISTOR 820KOHM+-5% 0.1W
R 257	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	R 607	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R 259	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R 608	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 260	0103841	CHIP RESISTOR 6800HM+-5% 0.1W	R 609	0103833	CHIP RESISTOR 1500HM+-5% 0.1W
R 261	0103829	CHIP RESISTOR 680HM+-5% 0.1W	R 610	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 262	0103841	CHIP RESISTOR 6800HM+-5% 0.1W	R 611	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 263	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 614	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R 265	0103839	CHIP RESISTOR 4700HM+-5% 0.1W	R 615	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R 266	0103829	CHIP RESISTOR 680HM+-5% 0.1W	R 616	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R 267	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	R 617	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 269	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	R 618	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 270	0103841	CHIP RESISTOR 6800HM+-5% 0.1W	R 619	0103874	CHIP RESISTOR 390KOHM+-5% 0.1W
R 275	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W	R 620	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 294	0103859	CHIP RESISTOR 4700HM+-5% 0.1W	R 621	0103878	CHIP RESISTOR 820KOHM+-5% 0.1W
R 297	0103839	CHIP RESISTOR 22KOHM+-5% 0.1W	R 622	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W
			R 623	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
			R 624	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS					
R 625	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R 681	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R 626	0103829	CHIP RESISTOR 680HM+-5% 0.1W	R 682	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 627	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R 683	0103868	CHIP RESISTOR 120KOHM+-5% 0.1W
R 628	0103837	CHIP RESISTOR 330OHM+-5% 0.1W	R 684	0103834	CHIP RESISTOR 180OHM+-5% 0.1W
R 629	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W	R 685	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 630	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 686	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 631	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R 687	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R 632	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W	R 688	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 633	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W	R 689	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R 634	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 690	0103872	CHIP RESISTOR 270KOHM+-5% 0.1W
R 635	0103868	CHIP RESISTOR 120KOHM+-5% 0.1W	R 691	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 636	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	R 692	0103878	CHIP RESISTOR 820KOHM+-5% 0.1W
R 637	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W	R 693	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W
R 638	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 901	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 639	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 902	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 640	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 903	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 641	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	R 904	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 642	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 905	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 643	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R 906	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 644	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R 907	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 645	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	R 908	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 646	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	R 909	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 647	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R 910	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 648	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 911	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 650	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R 912	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 651	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 913	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 652	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	R 914	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 653	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 915	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R 654	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W	R 916	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 655	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 917	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 656	0103831	CHIP RESISTOR 100OHM+-5% 0.1W	R 918	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R 657	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R 919	0103833	CHIP RESISTOR 150OHM+-5% 0.1W
R 658	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 920	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 659	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 921	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 660	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W	R 922	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 661	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R 923	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 662	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W	R 924	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 664	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 925	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 665	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 926	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R 666	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W	R 927	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R 667	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R 928	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 668	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	R 929	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R 669	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W	R 930	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 670	0103837	CHIP RESISTOR 330OHM+-5% 0.1W	R 931	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 671	0103819	CHIP RESISTOR 100HM+-5% 0.1W	R 932	0103868	CHIP RESISTOR 120KOHM+-5% 0.1W
R 672	0103819	CHIP RESISTOR 100HM+-5% 0.1W	R 933	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 673	0103819	CHIP RESISTOR 100HM+-5% 0.1W	R 934	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 674	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R 935	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 675	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R 936	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 676	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R 937	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R 678	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R 938	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 679	0103872	CHIP RESISTOR 270KOHM+-5% 0.1W	R 939	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 680	0103876	CHIP RESISTOR 560KOHM+-5% 0.1W	R 940	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
			R 941	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
			R 942	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS			R1102	0103838	CHIP RESISTOR 3900HM+-5% 0.1W
R 943	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1103	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R 944	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1104	0103855	CHIP RESISTOR 10KOHM-5% 0.1W
R 945	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1105	0103831	CHIP RESISTOR 1000HM+-5% 0.1W
R 946	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1106	0103840	CHIP RESISTOR 5600HM+-5% 0.1W
R 947	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1107	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 948	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1108	0103841	CHIP RESISTOR 3900HM+-5% 0.1W
R 949	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1109	0103842	CHIP RESISTOR 8200HM+-5% 0.1W
R 951	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W	R1110	0103841	CHIP RESISTOR 6800HM+-5% 0.1W
R 952	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W	R1111	0103821	CHIP RESISTOR 150HM+-5% 0.1W
R 953	0103837	CHIP RESISTOR 3300HM+-5% 0.1W	R1112	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R 954	0103842	CHIP RESISTOR 8200HM+-5% 0.1W	R1113	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 955	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1114	0103841	CHIP RESISTOR 6800HM+-5% 0.1W
R 956	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1115	0103840	CHIP RESISTOR 5600HM+-5% 0.1W
R 957	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W	R1116	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R 960	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1117	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 961	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1118	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 967	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1119	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 968	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1120	0103832	CHIP RESISTOR 1200HM+-5% 0.1W
R 977	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1121	0103840	CHIP RESISTOR 5600HM+-5% 0.1W
R 978	0103819	CHIP RESISTOR 100HM+-5% 0.1W	R1122	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 979	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1123	0103823	CHIP RESISTOR 220HM+-5% 0.1W
R 980	0103837	CHIP RESISTOR 3300HM+-5% 0.1W	R1124	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R 981	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1125	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 982	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1126	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 983	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1127	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 984	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1128	0103852	CHIP RESISTOR 56KOHM+-5% 0.1W
R 985	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1129	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R 986	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1130	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R 987	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1131	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 992	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1132	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 993	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1133	0103842	CHIP RESISTOR 8200HM+-5% 0.1W
R 996	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1134	0103842	CHIP RESISTOR 8200HM+-5% 0.1W
R 997	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1137	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 998	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1138	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R 999	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1139	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R1001	0103963	CHIP RESISTOR 220KOHM+-5% 1/8W	R1142	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1002	0103921	CHIP RESISTOR 680HM+-5%, 1/8W	R1143	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1003	0103944	CHIP RESISTOR 5.6KOHM+-5% 1/8W	R1144	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1004	0103925	CHIP RESISTOR 1500HM+-5%, 1/8W	R1145	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1006	0103936	CHIP RESISTOR 1.2K OHM +-5%	R1146	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1008	0103952	CHIP RESISTOR 27KOHM+-5% 1/8W	R1147	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1009	0103939	CHIP RESISTOR 2.2K OHM +-5%	R1148	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1010	0103945	CHIP RESISTOR 6.8KOHM+-5% 1/8W	R1149	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1011	0103937	CHIP RESISTOR 1.5KOHM+-5% 1/8W	R1150	0103835	CHIP RESISTOR 2200HM+-5% 0.1W
R1012	0103982	CHIP RESISTOR 4300HM+-5% 1/8W	R1153	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1013	0103926	CHIP RESISTOR 1800HM+-5% 1/8W	R1154	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1014	0103960	CHIP RESISTOR 120KOHM+-5%, 1/8W	R1155	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1015	0103947	CHIP RESISTOR 10KOHM+-5% 1/8W	R1156	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1016	0103984	CHIP RESISTOR 62KOHM+-5% 1/8W	R1157	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1017	0170640	METAL FILM 27MOHM+-1% 1/2W	R1158	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R1018	0103974	CHIP RESISTOR 5.6MOHM+-10% 1/8W	R1159	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1019	0103981	CHIP RESISTOR 2400HM+-5% 1/8W	R1160	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1101	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	R1161	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
			R1162	0103839	CHIP RESISTOR 4700HM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS					
R1163	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R1249	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1164	0103840	CHIP RESISTOR 560OHM+-5% 0.1W	R1250	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1165	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1251	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1166	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1252	0103877	CHIP RESISTOR 680KOHM+-5% 0.1W
R1167	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1255	0103835	CHIP RESISTOR 220OHM+-5% 0.1W
R1168	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1256	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R1169	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1257	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1170	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1258	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R1171	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	R1259	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1172	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1260	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1173	0103877	CHIP RESISTOR 680KOHM+-5% 0.1W	R1261	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1174	0103877	CHIP RESISTOR 680KOHM+-5% 0.1W	R1262	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1175	0103877	CHIP RESISTOR 680KOHM+-5% 0.1W	R1263	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1176	0103877	CHIP RESISTOR 680KOHM+-5% 0.1W	R1266	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1177	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W	R1267	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R1178	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W	R1268	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R1179	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R1269	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1181	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R1270	0103819	CHIP RESISTOR 100OHM+-5% 0.1W
R1182	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W	R1273	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1183	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W	R1274	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1184	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R1276	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1185	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R1277	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1186	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R1279	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R1187	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1281	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R1191	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W	R1282	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1192	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	R1283	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1194	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1284	0103839	CHIP RESISTOR 470OHM+-5% 0.1W
R1196	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R1285	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1198	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W	R1286	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1201	0103827	CHIP RESISTOR 47OHM+-5% 0.1W	R1287	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R1202	0103823	CHIP RESISTOR 220OHM+-5% 0.1W	R1288	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R1203	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1291	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R1204	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W	R1292	0103827	CHIP RESISTOR 470OHM+-5% 0.1W
R1205	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1293	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1206	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1294	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1209	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1295	0103838	CHIP RESISTOR 390OHM+-5% 0.1W
R1212	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1296	0103834	CHIP RESISTOR 180OHM+-5% 0.1W
R1217	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1298	0103873	CHIP RESISTOR 330KOHM+-5% 0.1W
R1224	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R1311	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R1225	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	R1312	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R1226	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	R1313	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R1228	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1316	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R1229	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W	R1317	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R1230	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	R1318	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1232	0103840	CHIP RESISTOR 560OHM+-5% 0.1W	R1319	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R1234	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1320	0103835	CHIP RESISTOR 220OHM+-5% 0.1W
R1237	0103868	CHIP RESISTOR 120KOHM+-5% 0.1W	R1321	0103832	CHIP RESISTOR 120OHM+-5% 0.1W
R1238	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R1322	0103872	CHIP RESISTOR 270KOHM+-5% 0.1W
R1239	0103831	CHIP RESISTOR 100OHM+-5% 0.1W	R1323	0103825	CHIP RESISTOR 33OHM+-5% 0.1W
R1241	0103831	CHIP RESISTOR 100OHM+-5% 0.1W	R1324	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R1242	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1325	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1244	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1326	0103836	CHIP RESISTOR 270OHM+-5% 0.1W
R1246	0103840	CHIP RESISTOR 560OHM+-5% 0.1W	R1327	0103834	CHIP RESISTOR 180OHM+-5% 0.1W
			R1328	0103837	CHIP RESISTOR 330OHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS					
R1330	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1522	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1331	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W	R1523	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1332	0103838	CHIP RESISTOR 390OHM+-5% 0.1W	R1525	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1333	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1527	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R1334	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1528	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1335	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1529	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R1336	0103825	CHIP RESISTOR 330OHM+-5% 0.1W	R1530	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1337	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W	R1531	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1338	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W	R1533	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R1339	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1534	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1340	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W	R1535	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1341	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W	R1536	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1342	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W	R1537	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1343	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W	R1538	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1344	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1539	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1345	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W	R1540	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1346	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	R1541	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1347	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W	R1542	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1348	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1543	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1349	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W	R1544	0103823	CHIP RESISTOR 220HM+-5% 0.1W
R1350	0103872	CHIP RESISTOR 270KOHM+-5% 0.1W	R1545	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R1351	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W	R1546	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1352	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W	R1548	0103830	CHIP RESISTOR 820HM+-5% 0.1W
R1354	0103971	CHIP RESISTOR 1MOHM+-5% 1/8W	R1549	0170474	FUSE RESISTOR 100HM+-5% 1/4W
R1356	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R1550	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R1357	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R1551	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1358	0103971	CHIP RESISTOR 1MOHM+-5% 1/8W	R1552	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R1359	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W	R1553	0103831	CHIP RESISTOR 1000HM+-5% 0.1W
R1360	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W	R1806	0103838	CHIP RESISTOR 390OHM+-5% 0.1W
R1361	0103839	CHIP RESISTOR 470OHM+-5% 0.1W	R1808	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R1362	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	R1811	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R1363	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1812	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1364	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1813	0103831	CHIP RESISTOR 1000HM+-5% 0.1W
R1365	0103838	CHIP RESISTOR 390OHM+-5% 0.1W	R1815	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R1370	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W	R1816	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R1374	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W	R1817	0103841	CHIP RESISTOR 680OHM+-5% 0.1W
R1381	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	R1818	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R1382	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W	R1819	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R1501	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1820	0103881	CHIP RESISTOR 2.2MOHM+-5% 0.1W
R1502	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1821	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R1503	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1822	0103827	CHIP RESISTOR 470HM+-5% 0.1W
R1504	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1826	0103840	CHIP RESISTOR 560OHM+-5% 0.1W
R1506	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R1827	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1507	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1835	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R1509	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R1836	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R1512	0103837	CHIP RESISTOR 330OHM+-5% 0.1W	R1837	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1514	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W	R1838	0103820	CHIP RESISTOR 120HM+-5% 0.1W
R1515	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W	R1839	0103880	CHIP RESISTOR 1.5MOHM+-5% 0.1W
R1516	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W	R1840	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R1517	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W	R1841	0103864	CHIP RESISTOR 56KOHM+-5% 0.1W
R1519	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W	R1845	0103827	CHIP RESISTOR 470HM+-5% 0.1W
R1520	0103827	CHIP RESISTOR 470HM+-5% 0.1W	R1847	0103836	CHIP RESISTOR 270OHM+-5% 0.1W
R1521	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W	R1848	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
			RT 201	5007433	SEMI VARIABLE 2.2KOHM
			RT 202	5007431	SEMI VARIABLE 470OHM

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS			RT1516	5007436	SEMI VARIABLE 22KOHM
RT 401	5007436	SEMI VARIABLE 22KOHM	RT1601	5005586	VARIABLE 20KOHM
RT 402	5007438	SEMI VARIABLE 100KOHM	RT1801	5007715	SEMI VARIABLE 10KOHM
RT 601	5007453	SEMI VARIABLE 470KOHM	RT1802	5007711	SEMI VARIABLE 470OHM
RT 602	5007452	SEMI VARIABLE 220KOHM	RT1803	5007468	VARIABLE 1MOHM
RT 603	5007452	SEMI VARIABLE 220KOHM	RT1804	5007712	SEMI VARIABLE 1KOHM
RT 604	5007451	SEMI VARIABLE 100KOHM	RT1805	5007468	VARIABLE 1MOHM
RT 605	5007451	SEMI VARIABLE 100KOHM	RV 101	5005584	VARIABLE RESISTOR 500KOHM
RT 901	5007447	SEMI VARIABLE 10KOHM	SEMI-CONDUCTORS		
RT 951	5007532	SEMI VARIABLE 10KOHM	D 050	5328321	DIODE MA151K (MH)
RT1101	5007443	SEMI VARIABLE 470OHM	D 051	5328321	DIODE MA151K (MH)
RT1102	5007447	SEMI VARIABLE 10KOHM	D 080	5381931	DIODE 1HD101
RT1103	5007446	SEMI VARIABLE RESISTOR 4.7KOHM	D 081	5381931	DIODE 1HD101
RT1104	5007445	SEMI VARIABLE 2.2KOHM	D 082	5381931	DIODE 1HD101
RT1105	5007445	SEMI VARIABLE 2.2KOHM	D 083	5381931	DIODE 1HD101
RT1107	5007437	SEMI VARIABLE 47KOHM	D 084	5381931	DIODE 1HD101
RT1108	5007437	SEMI VARIABLE 47KOHM	D 125	5380931	DIODE GL450
RT1109	5007437	SEMI VARIABLE 47KOHM	D 201	5331592	DIODE 1SS133
RT1110	5007437	SEMI VARIABLE 47KOHM	D 202	5328321	DIODE MA151K (MH)
RT1111	5007437	SEMI VARIABLE 47KOHM	D 203	5328321	DIODE MA151K (MH)
RT1112	5007437	SEMI VARIABLE 47KOHM	D 204	5332181	DIODE 1SS106
RT1113	5007434	SEMI VARIABLE 4.7KOHM	D 205	5332181	DIODE 1SS106
RT1114	5007434	SEMI VARIABLE 4.7KOHM	D 206	5332181	DIODE 1SS106
RT1115	5007445	SEMI VARIABLE 2.2KOHM	D 207	5328321	DIODE MA151K (MH)
RT1116	5007445	SEMI VARIABLE 2.2KOHM	D 208	5328303	DIODE MA152WK (MU)
RT1117	5007445	SEMI VARIABLE 2.2KOHM	D 209	5330133	DIODE 1S2076
RT1120	5007433	SEMI VARIABLE 2.2KOHM	D 211	5330133	DIODE 1S2076
RT1121	5007434	SEMI VARIABLE 4.7KOHM	D 212	5331051	DIODE 1K60
RT1122	5007434	SEMI VARIABLE 4.7KOHM	D 401	5328302	DIODE MA151WA (MN)
RT1123	5007447	SEMI VARIABLE 10KOHM	D 402	5328381	DIODE MA153 (MC)
RT1317	5007455	SEMI VARIABLE RESISTOR 100OHM	D 601	5328303	DIODE MA152WK (MU)
RT1318	5007715	SEMI VARIABLE 10KOHM	D 602	5328303	DIODE MA152WK (MU)
RT1319	5007712	SEMI VARIABLE 1KOHM	D 603	5328304	DIODE MA152WA (MO)
RT1320	5007795	SEMI VARIABLE 150KOHM	D 604	5328321	DIODE MA151K (MH)
RT1321	5007461	SEMI VARIABLE 47KOHM	D 605	5328381	DIODE MA153 (MC)
RT1322	5007464	SEMI VARIABLE 47KOHM	D 607	5328303	DIODE MA152WK (MU)
RT1323	5007793	SEMI VARIABLE 2.2MOHM	D 608	5328304	DIODE MA152WA (MO)
RT1324	5007747	SEMI VARIABLE 470K OHM	D 609	5328303	DIODE MA152WK (MU)
RT1325	5007459	SEMI VARIABLE 2.2KOHM	D 610	5328381	DIODE MA153 (MC)
RT1501	5007436	SEMI VARIABLE 22KOHM	D 612	5328304	DIODE MA152WA (MO)
RT1502	5007436	SEMI VARIABLE 22KOHM	D 613	5328303	DIODE MA152WK (MU)
RT1503	5007436	SEMI VARIABLE 22KOHM	D 615	5328321	DIODE MA151K (MH)
RT1504	5007436	SEMI VARIABLE 22KOHM	D 616	5328321	DIODE MA151K (MH)
RT1505	5007436	SEMI VARIABLE 22KOHM	D 617	5331671	DIODE DS135D
RT1506	5007436	SEMI VARIABLE 22KOHM	D 618	5331671	DIODE DS135D
RT1507	5007436	SEMI VARIABLE 22KOHM	D 619	5328381	DIODE MA153 (MC)
RT1508	5007436	SEMI VARIABLE 22KOHM	D 620	5328321	DIODE MA151K (MH)
RT1509	5007436	SEMI VARIABLE 22KOHM	D 621	5328321	DIODE MA151K (MH)
RT1510	5007436	SEMI VARIABLE 22KOHM	D 622	5328381	DIODE MA153 (MC)
RT1511	5007436	SEMI VARIABLE 22KOHM	D 630	5331671	DIODE DS135D
RT1512	5007436	SEMI VARIABLE 22KOHM	D 631	5331671	DIODE DS135D
RT1513	5007436	SEMI VARIABLE 22KOHM	D 902	5328321	DIODE MA151K (MH)
RT1514	5007436	SEMI VARIABLE 22KOHM	D 905	5328303	DIODE MA152WK (MU)
RT1515	5007436	SEMI VARIABLE 22KOHM	D 906	5328321	DIODE MA151K (MH)

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS			IC1102	5374742	IC HT5425A
D 907	5328303	DIODE MA152WK (MU)	IC1103	5352771	IC NJM2904D
D 909	5328303	DIODE MA152WK (MU)	IC1104	5370214	IC HT5458C
D 910	5328303	DIODE MA152WK (MU)	IC1105	5374752	IC HT5426A
D 912	5328303	DIODE MA152WK (MU)	IC1106	5375362	IC HT5429A
D 951	5332541	DIODE ERA 81-004	IC1303	5364721	IC NJM3415D
D 952	5332541	DIODE ERA 81-004	IC1304	5364721	IC NJM3415D
D 953	5328304	DIODE MA152WA (MO)	IC1305	5350601	IC NJM4558D
D 954	5328321	DIODE MA151K (MH)	IC1502	5370331	IC HT5267
D 970	5331671	DIODE DS135D	IC1503	5377791	IC HT5198
D1001	5332401	DIODE MA165	IC1506	5366501	IC AN6541
D1101	5328321	DIODE MA151K (MH)	IC1507	5370221	IC HT5263
D1102	5328321	DIODE MA151K (MH)	IC1604	5366181	IC AN78M08R
D1105	5328321	DIODE MA151K (MH)	IC1801	5364742	IC BA7125L
D1110	5328302	DIODE MA151WA (MN)	Q 051	5328335	TRANSISTOR 2SB709A-RS
D1301	5328321	DIODE MA151K (MH)	Q 052	5328335	TRANSISTOR 2SB709A-RS
D1302	5328303	DIODE MA152WK (MU)	Q 053	5328335	TRANSISTOR 2SB709A-RS
D1303	5328303	DIODE MA152WK (MU)	Q 054	5328791	TRANSISTOR DTC124K-25
D1501	5328303	DIODE MA152WK (MU)	Q 055	5328791	TRANSISTOR DTC124K-25
D1502	5328303	DIODE MA152WK (MU)	Q 056	5328791	TRANSISTOR DTC124K-25
D1503	5328303	DIODE MA152WK (MU)	Q 057	5328791	TRANSISTOR DTC124K-25
D1506	5328303	DIODE MA152WK (MU)	Q 101	5328971	TRANSISTOR 2SC2412KBRST
D1601	5381941	LED GL1PR101	Q 119	5381041	PHOTO TRANSISTOR N1L5141E
D1602	5381941	LED GL1PR101	Q 123	5380131	PHOTO TRANSISTOR PH101
D1603	5381941	LED GL1PR101	Q 124	5380131	PHOTO TRANSISTOR PH101
D1801	5331001	DIODE 1SS81	Q 201	5328335	TRANSISTOR 2SB709A-RS
D1802	5328321	DIODE MA151K (MH)	Q 203	5328971	TRANSISTOR 2SC2412KBRST
D1803	5381943	LED GL1PR101	Q 204	5328971	TRANSISTOR 2SC2412KBRST
IC 050	5311551	IC S8056H	Q 207	5328971	TRANSISTOR 2SC2412KBRST
IC 201	5374381	IC HT4440	Q 208	5328335	TRANSISTOR 2SB709A-RS
IC 202	5374492	IC HT6502A	Q 209	5328971	TRANSISTOR 2SC2412KBRST
IC 203	5375321	IC HT4517	Q 212	5328793	TRANSISTOR DTC 144K-26
IC 204	5375332	IC HT4519A	Q 213	5328335	TRANSISTOR 2SB709A-RS
IC 401	5363321	IC BA5112LS	Q 214	5328793	TRANSISTOR DTC 144K-26
IC 402	5364201	IC UPC1513HA	Q 215	5328335	TRANSISTOR 2SB709A-RS
IC 601	5355892	IC HA11747 BNT	Q 216	5328793	TRANSISTOR DTC 144K-26
IC 602	5366631	IC BA6303F	Q 217	5328792	MICRO PACKAGE TRANSISTOR DTA124K(15)
IC 603	5366631	IC BA6303F	Q 218	5328335	TRANSISTOR 2SB790A-RS
IC 604	5369911	IC M54548L	Q 219	5328335	TRANSISTOR 2SB709A-RS
IC 605	5366371	IC HA13434	Q 220	5328792	TRANSISTOR DTA124K (15)
IC 606	5366601	IC BA6305	Q 401	5328793	TRANSISTOR DTC 144K-26
IC 607	5363182	IC UPC358G	Q 402	5328971	TRANSISTOR 2SC2412KBRST
IC 608	5368231	IC UPD4013BG	Q 404	5328351	TRANSISTOR 2SD602R(WR)
IC 609	5369391	IC MSL9378RS	Q 405	5328792	MICRO PACKAGE TRANSISTOR DTA124K(15)
IC 610	5366561	IC TK19080L	Q 406	5328793	TRANSISTOR DTC 144K-26
IC 901	5361752	IC HD614042FB93	Q 601	5328793	TRANSISTOR DTC 144K-26
IC 902	5366781	IC UPC339G2	Q 602	5328793	TRANSISTOR DTC 144K-26
IC 903	5369171	IC M54543L	Q 603	5328793	TRANSISTOR DTC 144K-26
IC 904	5366591	IC BA6125	Q 604	5328793	TRANSISTOR DTC 144K-26
IC 905	5364601	IC M5278L-05	Q 606	5328793	TRANSISTOR DTC 144K-26
IC 906	5377821	IC HT4422	Q 901	5328971	TRANSISTOR 2SC2412KBRST
IC 907	5366611	IC TA78L009P	Q 902	5328971	TRANSISTOR 2SC2412KBRST
IC 960	5374561	IC HT4442	Q 903	5328971	TRANSISTOR 2SC2412KBRST
IC1101	5370341	IC HT5439	Q 904	5328335	TRANSISTOR 2SB709A-RS
			Q 905	5328335	TRANSISTOR 2SB709A-RS

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
SEMI-CONDUCTORS			Q1308	5328351	TRANSISTOR 2SD602R(WR)
Q 906	5328971	TRANSISTOR 2SC2412KBRST	Q1309	5323931	TRANSISTOR 2SD1083L
Q 907	5328971	TRANSISTOR 2SC2412KBRST	Q1310	5322681	TRANSISTOR 2SB793R
Q 908	5328335	TRANSISTOR 2SB709A-RS	Q1311	5328343	TRANSISTOR 2SD601R(YR)
Q 909	5328971	TRANSISTOR 2SC2412KBRST	Q1312	5328241	TRANSISTOR 2SC2463E (DE)
Q 910	5328971	TRANSISTOR 2SC2412KBRST	Q1313	5328691	TRANSISTOR 2SB792S (IS)
Q 911	5328793	TRANSISTOR DTC 144K-26	Q1314	5328343	TRANSISTOR 2SD601R(YR)
Q 951	5324081	TRANSISTOR 2SB962	Q1315	5328691	TRANSISTOR 2SB792S (IS)
Q 952	5324081	TRANSISTOR 2SB962	Q1316	5328691	TRANSISTOR 2SB792S (IS)
Q 953	5328793	TRANSISTOR DTC 144K-26	Q1317	5328861	TRANSISTOR 2SB710R(CR)
Q 954	5328793	TRANSISTOR DTC 144K-26	Q1318	5323332	TRANSISTOR 2SD882-Q
Q1001	5328341	TRANSISTOR 2SD601Y(RS)	Q1319	5328701	TRANSISTOR 2SD814S (PS)
Q1002	5328751	TRANSISTOR 2SA1022C	Q1321	5328343	TRANSISTOR 2SD601R(YR)
Q1004	5328741	TRANSISTOR 2SC2404C	Q1501	5321292	TRANSISTOR 2SC1740S
Q1005	5328751	TRANSISTOR 2SA1022C	Q1502	5321204	TRANSISTOR SILICON 2SB562BC 1MHZ 90 OMW
Q1006	5326041	TRANSISTOR 2SK316Q(1KQ)	Q1503	5320593	TRANSISTOR 2SA673C
Q1101	5328973	TRANSISTOR 2SC2412K-BST	Q1504	5328791	TRANSISTOR DTC124K-25
Q1102	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1505	5328791	TRANSISTOR DTC124K-25
Q1103	5328973	TRANSISTOR 2SC2412K-BST	Q1506	5328792	MICRO PACKAGE TRANSISTOR DTA124K(15)
Q1104	5326081	TRANSISTOR 2SK374Q(2BQ)	Q1507	5328791	TRANSISTOR DTC124K-25
Q1105	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1510	5328741	TRANSISTOR 2SC2404C
Q1106	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1511	5328791	TRANSISTOR DTC124K-25
Q1107	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1512	5328741	TRANSISTOR 2SC2404C
Q1108	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1514	5328272	TRANSISTOR 2SK160(5) (K5)
Q1109	5328973	TRANSISTOR 2SC2412K-BST	Q1515	5328791	TRANSISTOR DTC124K-25
Q1110	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1516	5328792	MICRO PACKAGE TRANSISTOR DTC124K(15)
Q1111	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1520	5329192	TRANSISTOR 2SC2462D(CD)
Q1112	5326081	TRANSISTOR 2SK374Q(2BQ)	Q1601	5323561	TRANSISTOR DTC124F
Q1113	5328973	TRANSISTOR 2SC2412K-BST	Q1801	5328211	TRANSISTOR 2SA1121 (SC)
Q1114	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	Q1802	5328241	TRANSISTOR 2SA1121C (DE)
Q1116	5328973	TRANSISTOR 2SC2412K-BST	Q1803	5323831	TRANSISTOR 2SD974
Q1117	5328973	TRANSISTOR 2SC2412K-BST	TH1101	5340282	THERMISTOR 112102-2
Q1121	5328973	TRANSISTOR 2SC2412K-BST	ZD 901	5330325	DIODE HZ9A2
Q1122	5328973	TRANSISTOR 2SC2412K-BST	ZD 902	5331019	DIODE HZ-3B3
Q1123	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	ZD 903	5330328	DIODE HZ-9C3
Q1133	5328201	TRANSISTOR 2SC2618C(RC)	ZD1501	5330714	DIODE HZ4B
Q1134	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	TRANSFORMERS		
Q1135	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	T 401	5262511	BIAS OSC.COIL
Q1136	5328973	TRANSISTOR 2SC2412K-BST	T1301	5271522	FBT
Q1137	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	T1801	5271811	FBT
Q1138	5328251	TRANSISTOR 2SA1122-CD MICRO PACKAGE	COILS		
Q1143	5328973	TRANSISTOR 2SC2412K-BST	L 201	5152601	CHOKE COIL 33UH+-10%
Q1144	5328973	TRANSISTOR 2SC2412K-BST	L 202	5152337	CHOKE COIL 100UH
Q1145	5328973	TRANSISTOR 2SC2412K-BST	L 203	5152337	CHOKE COIL 100UH
Q1294	5328973	TRANSISTOR 2SC2412K-BST	L 204	5152612	CHOKE COIL 220MICRO H
Q1295	5328973	TRANSISTOR 2SC2412K-BST	L 205	5152337	CHOKE COIL 100UH
Q1296	5328973	TRANSISTOR 2SC2412K-BST	L 208	5152604	CHOKE COIL 56UH+-10%
Q1301	5328351	TRANSISTOR 2SD602R(WR)	L 209	5152598	CHOKE COIL 22UH+-10%
Q1302	5323931	TRANSISTOR 2SD1083L	L 211	5152583	CHOKE COIL 1.5UF+-10%
Q1303	5328241	TRANSISTOR 2SC2463E (DE)	L 212	5152597	CHOKE COIL 18UH+-10%
Q1304	5328701	TRANSISTOR 2SD814S (PS)	L 213	5152596	CHOKE COIL 15UH
Q1305	5328692	TRANSISTOR 2SB792T(IT)	L 214	5152341	CHOKE COIL 180UH
Q1306	5328692	TRANSISTOR 2SB792T(IT)			
Q1307	5328343	TRANSISTOR 2SD601R(YR)			

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
COILS			F 970	5720177	FUSE 2A
L 215	5152602	CHOKE COIL 39UH	H 970	5722211	FUSE HOLDER
L 216	5152337	CHOKE COIL 100UH	H 971	5722211	FUSE HOLDER
L 225	5152594	CHOKE COIL 10UH	J 101	5673791	JACK
L 226	5152599	CHOKE COIL 27MICRO H	J 401	5673781	JACK
L 401	5152815	CHOKE COIL 22MH	J 970	5674341	JACK
L 402	5152971	CHOKE COIL 5.6MH+-5X	RL 901	5641861	RELAY
L 403	5152346	CHOKE COIL 470UH	S 050	5622811	SLIDE SWITCH
L 601	5152603	CHOKE COIL 47UF	S 051	5633911	SWITCH
L 951	5152751	CHOKE COIL 120UH	S 052	5633911	SWITCH
L 952	5152752	CHOKE COIL 50UH	S 053	5633911	SWITCH
L 953	5152752	CHOKE COIL 50UH	S 054	5633911	SWITCH
L 954	5152943	CHOKE COIL 390UH	S 055	5633911	SWITCH
L 960	5152607	CHOKE COIL 100MICRO H	S 056	5633911	SWITCH
L1001	5152593	CHOKE COIL 8.2UH	S 121	5635221	SWITCH
L1002	5152982	CHOKE COIL 340UH	S 122	5635221	SWITCH
L1101	5152614	CHOKE COIL 330UH	S1601	5622182	SWITCH
L1102	5152607	CHOKE COIL 100MICRO H	S1602	5622182	SWITCH
L1103	5152607	CHOKE COIL 100MICRO H	S1603	5633911	SWITCH
L1104	5152611	CHOKE COIL 180UH	S1604	5633911	SWITCH
L1105	5152607	CHOKE COIL 100MICRO H	S1605	5635034	SWITCH
L1106	5152595	CHOKE COIL 12UH	S1606	5635034	SWITCH
L1107	5152595	CHOKE COIL 12UH	FOR FINAL ASSEMBLY		
L1108	5152607	CHOKE COIL 100MICRO H	101	6076481	KNOB
L1109	5152607	CHOKE COIL 100MICRO H	102	6592571	BUTTON SHEET
L1110	5152613	CHOKE COIL 270UH	103	6026201	SIDE COVER (R)
L1112	5152604	CHOKE COIL 56UH+-10X	104	6082674	BUTTON
L1113	5152608	CHOKE COIL 120UH+-10X	105	6082693	BUTTON
L1114	5152602	CHOKE COIL 39UH	106	5967821	BATTERY TERMINAL ASSEMBLY
L1115	5152613	CHOKE COIL 270UH	107	6188953	COVER
L1116	5152607	CHOKE COIL 100MICRO H	108	6335686	HAND STOLAP
L1117	5152612	CHOKE COIL 220MICRO H	109	6889651	BOTTOM FRAME
L1301	5152813	CHOKE COIL 10MH	110	6076541	KNOB
L1302	5270002	COIL 33MH	111	6076531	KNOB
L1303	5152337	CHOKE COIL 100UH	112	6076473	SLIDE KNOB
L1501	5152589	CHOKE COIL 4.7UH	113	6076492	KNOB
L1801	5152589	CHOKE COIL 4.7UH	114	6026214	SIDE COVER (L)
L1802	5152612	CHOKE COIL 220MICRO H	115	6889225	LEVER
L1804	5270574	COIL	116	6082683	BUTTON
L1805	5152603	CHOKE COIL 47UF	117	6887431	TOP PIECE
MISCELLANEOUS			118	7393721	ACCESSARY SHOE
CP 204	5162475	BAND PASS FILTER	119	6645432	E.V.F SHOE
CP 205	5162592	HIGH PASS FILTER	120	6539093	SPRING
CP1101	5162841	TRAP COIL	121	6189401	CASSETTE LID
CP1102	5162584	LOW PASS FILTER	122	7784364	SCREW
CP1103	5162851	DELAY LINE	123	6890301	COVER
CP1105	5162843	BAND PASS FILTER	124	7784341	SCREW
CX 901	5781021	CERAMIC OSC	126	7748771	KNOB SHEET
DL 201	5785411	DELAY LINE	130	6889085	PLATE
DL 202	5785811	DELAY LINE	202	6887704	SUPPLY REEL TABLE
DL1101	5162861	LOW PASS FILTER	203	6887714	TAKE-UP REEL TABLE
DL1102	5162546	DELAY LINE	204	6888262	BRAKE
DL1104	5162842	LOW PASS FILTER	205	6544711	SPRING
			206	6979911	ARM

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR FINAL ASSEMBLY			262	6889271	JACK HOLDER
207	7392882	PRESSURE ROLLER ARM	263	6889232	HOLDER
208	6544724	SPRING	264	6889172	HOLDER
209	6544762	SPRING	265	6539202	SPRING
210	6979802	BEARING	266	7748252	BELT COVER
211	6888933	BRAKE	267	6889292	HINGE
212	6544755	SPRING	268	6887462	HOLDER
213	6974642	ARM	274	6539182	SPRING
214	6550813	SPRING	275	4503406	GUIDE ROLLER
215	6888865	HOLDER	276	4504012	FLANGE
216	7392924	TENTION ARM	301	7031871	GEAR BLOCK
217	6979942	ARM	302	6375065	FLYWHEEL
218	7393333	BAND	303	6358012	BELT
219	7393582	SPRING STOPPER	304	6356441	BELT
220	6544736	SPRING	305	6356443	BELT
221	6888963	HOLDER	306	7392802	GEAR
222	5575741	CAPSTAN MOTOR	307	7392792	GEAR
223	6344951	IMPEDANCE ROLLER	308	6889043	ARM
224	4503433	FLANGE	309	7393052	SLIDER
225	6522391	SPRING	310	6889033	LORDING ARM
226	6888342	HEAD BASE	311	7393175	SLIDER
227	5447761	FELL ERASE HEAD	312	6888877	LORDING GEAR
228	6550781	SPRING	313	6888753	HOLDER
229	7393013	ARM	314	6888793	GEAR
230	7392982	PLATE	315	5612612	SWITCH
231	6888531	GUIDE ROLLER	316	6888552	ARM
232	4504421	FLANGE	317	7393072	GEAR PLATE
233	4504011	FLANGE	318	7392761	SLIDER
234	4504461	TAPE GUIDE	319	6544783	SPRING
235	6522432	SPRING	320	6550941	SPRING
236	7785621	NUT	321	6344632	DAMPER
237	7777505	FLYWHEEL HOLDER	322	5578751	LODING MOTOR
238	6550791	SPRING	401	7393128	CASSETTE HOLDER ASSEMBLY
239	5447751	AUDIO CONTROL HEAD	402	6889027	HOLDER
240	6539041	SPRING	403	6888603	HOLDER
241	6522441	SPRING	404	6888952	HOLDER
242	7787031	THRUST SUPPORT	601	6891211	FRAME
243	6750441	RETAINER	602	7452702	SHIELD CASE
245	6979762	CATCHER O	603	6956092	LENS BLOCK
246	5792925	BRUSH	607	5381693	BIAS LIGHT
247	6979895	GUIDE ROLLER BASE(O)	608	5883812	CONNECTOR
248	7392783	PLATE	609	5884861	CONNECTOR-EVF
249	6979835	GUIDE ROLLER BASE (1)	612	8691308	BT SCREW-2.6MMDX8MM
250	7394151	PLATE	614	8813113	WASHER-2.6D
251	4503404	GUIDE ROLLER	701	6025615	UPPER CASE
252	6979962	ARM	703	6887751	UPPER NECK
253	6888802	ARM	704	6955931	LENS
254	6539052	SPRING	705	6082511	BUTTON
255	6979972	STOPPER	706	6592292	CAP
256	6888573	GUIDE RAIL	707	6888678	COVER
257	7392736	LOADING LINK	708	6539171	SPRING
258	7392773	LOADING LINK	709	6890131	HOLDER
260	6888982	LED HOLDER	710	7393831	BRACKET
261	6076501	WHEEL	711	6592122	RUBBER
			713	6536115	SPRING

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR FINAL ASSEMBLY			973	7787615	WASHER
714	6693123	MIRROR	974	8741110	BIND SCREW-2MMDX 10MM
715	6888651	LEVER HOLDER	975	8741104	BIND SCREW-2MMDX4MM
716	6887721	BUTTON LEVER	976	7230901	E RING
717	6082521	BUTTON	977	7788623	WASHER
718	6025232	BOTTOM CASE	978	7230901	E RING
719	6889981	BOTTOM PIECE	979	7787616	WASHER
721	6887732	SHOE PIECE	980	8650105	SCREW (2X5)
722	6889573	LOCK PIECE	981	8741103	SCREW(2X3B)
723	6890003	BOTTOM PIECE	982	8691106	DT SCREW-2MMDX6MM
724	5311451	CRT	983	8741105	SCREW
725	5271865	DEFLECTION YOKE	984	8741110	BIND SCREW-2MMDX 10MM
726	5855212	CABLE	985	7789791	WASHER
727	5672442	JACK	989	7780902	PAN HEAD SCREW-1.7MMDX2MM
728	5422283	MICROPHONE	990	8741104	BIND SCREW-2MMDX4MM
730	6539241	SPRING	992	8741106	BIND SCREW-2MMDX6MM
732	5654454	CRT SOCKET	994	7784371	SCREW
733	6592421	HOLDER	995	8741106	BIND SCREW-2MMDX6MM
901	8691106	DT SCREW-2MMDX6MM	996	7782611	SCREW
902	8691308	BT SCREW-2.6MMDX8MM	997	7786117	POLYSLIDER WASHER
903	8691305	SCREW (2.6X5)	998	7778847	POLY SLIDER WASHER
905	8699308	BT BIND SCREW-2.6MMDX8MM(BLACK)	998	7789841	POLY-SLIDER WASHER
906	7784371	SCREW	999	8811113	WASHER 2.6MMD
931	8699305	SCREW (2.6X5)	FOR ACCESSORIES		
932	8711108	PAN HEAD SCREW-2MMDX8MM	4648901 OPERATING GUIDE		
933	7781582	FALT SCREW-3MMDX10MM(BLACK)			
934	8699308	BT BIND SCREW-2.6MMDX8MM(BLACK)			
941	7787535	PS.WASHER			
942	7778859	POLYSLIDER WASHER			
943	8741108	BINDSREW-2MMDX8MM			
944	7230901	E RING			
947	8741104	BIND SCREW-2MMDX4MM			
948	7778859	POLYSLIDER WASHER			
949	7787615	WASHER			
950	8741103	SCREW(2X3B)			
951	8650104	SCREW			
952	8691108	SCREW(2X8)			
953	8741103	SCREW(2X3B)			
954	7788901	WASHER			
955	8741103	SCREW(2X3B)			
956	7788901	WASHER			
957	8619001	SCREW (BT1.7X3)			
958	8741104	BIND SCREW-2MMDX4MM			
959	8691105	SCREW			
960	8741103	SCREW(2X3B)			
961	7785182	NUT			
963	7787615	WASHER			
964	7780901	PAN HEAD SCREW-1.7MMDX4MM			
967	8741104	BIND SCREW-2MMDX4MM			
968	8741106	BIND SCREW-2MMDX6MM			
969	8741105	SCREW			
970	7780905	SCREW (1.7X6)			
971	7780905	SCREW (1.7X6)			
972	8691106	DT SCREW-2MMDX6MM			